September 6, 1943

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

★ ★ BACK THE ATTACK . . . WITH WAR BONDS ★ ★

TECHNOLOGY DEPT.

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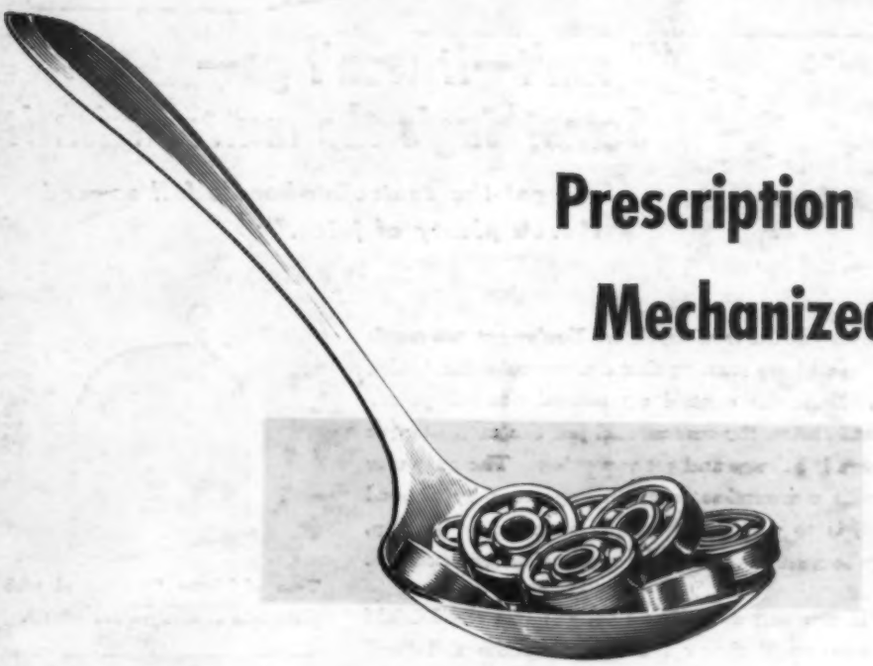


Prescription for Mechanized War!

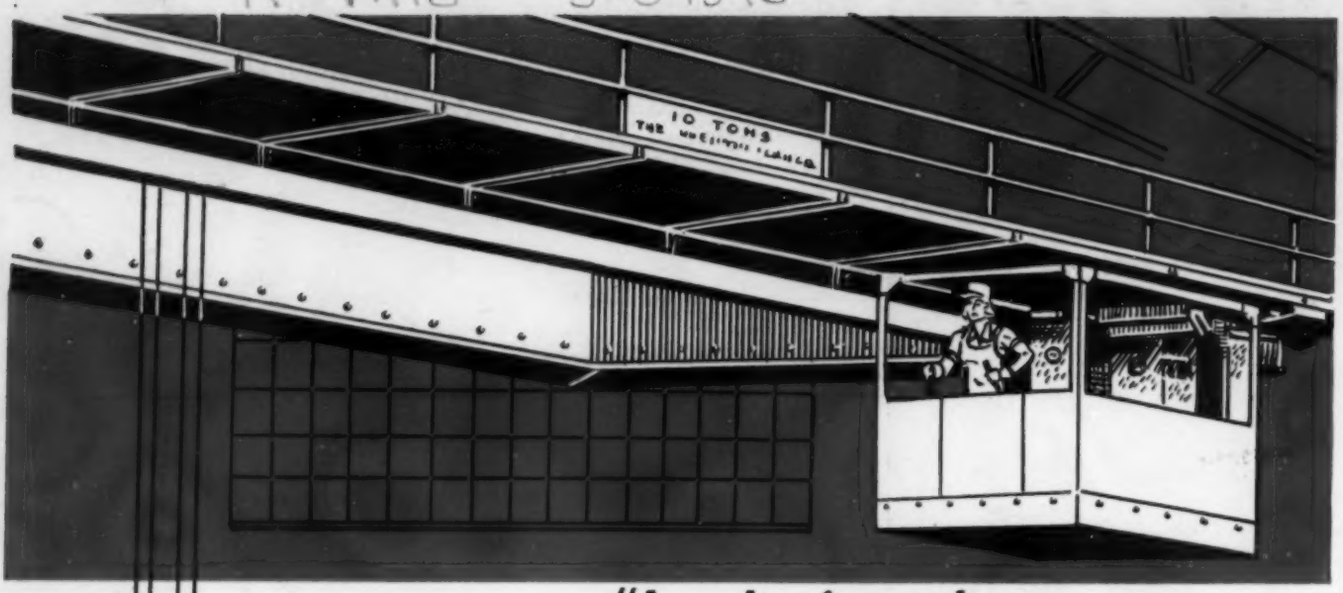
THE "PILLS" shown above are bad medicine for the Axis.
They are ball bearings.
Multiply them by tens of thousands, *daily*,
and you have the freedom from friction and wear
which makes today's mechanized war possible.
Ball bearings, by the tens of millions,
are used in tanks, planes, guns, ships.
Without them, sustained action
in destroying our enemies would be impossible.
Thus do NEW DEPARTURE ball bearings—
as near perfection as engineering science
can make them—play their parts
in winning Victory!

New Departure Division of General Motors.

New Departure

THE FORGED STEEL BEARING

✓ R 1.113² S-01943



"HURRY UP SISTER!"

"I can't—it won't go—Something's the matter with it!"

"I've got the controller-handle full on—and there's plenty of juice."

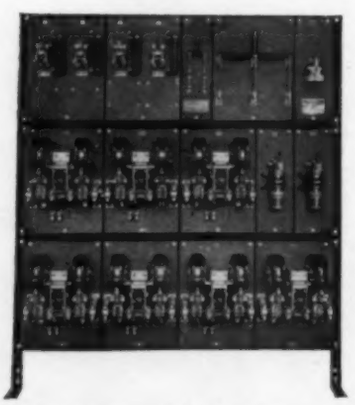
★ That's just the trouble, sister. You've got too much juice and are roasting that a.c. wound-rotor bridge motor. Back the control up toward the off point. That will reduce the current and put the motor-torque up where it belongs and get you going. The only way to handle a wound-rotor motor, operated by manual control, is to notch the control along, step by step, giving the motor a chance to get going between notches.

Now, if you had a magnetic control like the EC&M type, you could throw the master-handle full "on" without trouble, the EC&M Frequency Relays automatically taking care of acceleration and plugging for you.

This control protects the motor, too. For example, one was installed over a year ago on a foundry crane and since then there has not been a minute's delay, while on some of the other cranes in this plant, bridge motors last an average of only three months before they need rewinding.

Today, many carefully engineered cranes are equipped with EC&M Frequency Relay Magnetic Control, complete facts about which are given in Booklet 930. Write for your copy today.

Type of Master Switch used with Magnetic Control. Bulletin 1182, Type NT Master.



EC&M 37 H.P., 550 Volt A.C. Reversing-Plugging, Frequency Relay Magnetic Controller for Bridge Motion of overhead crane in steel mill.

THE ELECTRIC CONTROLLER & MFG. CO.

2700 East 79th Street ★ Cleveland 4, Ohio

Tech

Suppose it happened. Not a test, this time; the real thing. An aircraft spotter, perhaps in some remote island outpost, suddenly freezes to attention, peers through binoculars . . . leaps to his telephone.

"Enemy planes!" . . . Up and down the coast his message flashes. Myriads of wires relay it, under rivers, over mountains, to airfields and anti-aircraft batteries. Sirens howl. Pilots scramble into cockpits, and dozens of fighter planes roar upward into the sky.

America's coast defense system is tied together by a communication network of wire. In an emergency, this network runs the show, coordinates the interceptor command and helps protect civilians in the cities against falling bombs.

Bethlehem is supplying many tons of bethanized (electrolytically zinc-coated) wire to armor the underwater cables of this vast coastal communications net. We also furnish, through distributors, many miles of telephone wire for use by the U. S. Coast Guard on both the Atlantic and Pacific coasts. This is but one of the many ways in which Bethlehem wire mills are working to protect the home front and to speed the day of victory.

BETHLEHEM STEEL

CONTOURING

... another Function of the Shaper

WHILE the Shaper is indispensable in the toolroom, it is also very much at home in manufacturing shops.

In your shop there may be jobs, involving the principle of contouring, that are best performed on a Shaper.

Cincinnati Shapers are accurate . . . responsive . . . profitable.

Write for Catalog N-2.

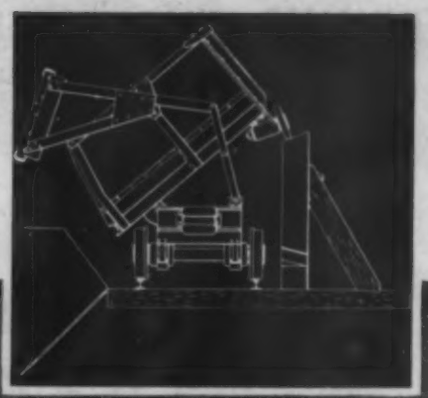
THE CINCINNATI SHAPER CO.

CINCINNATI OHIO U.S.A.

SHAPERS BRAKES SHEARS

EASTON GRANBY CARS

A fundamentally sound design which combines low overall height with large capacity for mine haulage. One of many Easton mine car designs, the Granby is moving mountains of ore daily in iron, lead, zinc, limestone and other underground mining operations. Diagram at left shows how Granby car is dumped automatically when roller at back rides over the inclined rail. Easton designs and installs the complete system.



Keep moving with EASTON

It is *your* job to keep mountains of earth, ore and rock moving from where they are to where they are needed in the War Production Program. It is *our* job to help you to design track or trackless haulage equipment to fit your requirements, to adapt the design to the availability of materials, and to follow each order through to earliest possible delivery. May we get to work on your haulage problem *now*—to help you achieve your desired capacity at lowest cost per ton? Write to Easton Car & Construction Company, Easton, Pa.

The famous EASTON Phoenix Quarry Car. Doorless, 2-way dump. Timken Bearings.

EASTON Cornwall Mine Car. With automatic downfolding door. Timken Bearings.

The EASTON TR-15H Trackless Mine Car. A matchless record in quarry service.

BEHIND THE SCENES

Happy Homecoming

■ It's really murder to have to be away from the office these days, whether it's for business or pleasure. You come back to face a desk piled two feet high, telephones ringing, and a million things to do all at once. It's just the opposite of that old story about hitting yourself over the head with a hammer because it feels so good when you stop.

Industrial Sabotage

■ There certainly can't be much of this sort of thing going on but here's the story behind the apparent failure of a shell cleaning machine to operate properly in one of the war plants recently. The machine, an automatic sand blast cleaning machine designed to operate at from 250 to 300 shells per hour, was turning out only 30 shells per hour, and looking into it the management found the workmen were not placing the shells on the hooks at anywhere near the speed they were supposed to.

Further, the investigation developed the fact that when the machine had been installed the workmen had adjusted the controls so as to slow down operation from normal to only 75 shells per hour. Later when a lock was placed on the controls so that the machine could operate a fixed speed of 250 per hour, the workmen, it appears, simply refused to put the shells on the hooks with the result the machine was slowly blasting itself to pieces.

Sabotage, you know, means wooden shoe, because that's what the French used to throw into the machinery. This slightly more modern version is not one whit less costly.

Success Secret

■ We've all heard a lot about the hustle and team spirit which is the key to success at the Kaiser shipyards. To combat absenteeism a program was devised called "presenteeism" and is based on graduated awards presented to so-called "anchor men" who are on the job for 6, 8 and 12 months at a stretch with no lost time.

Shipyard managers are mostly young fellows. They have full authority and are not required to report continually to the "front office." Kaiser's theory is simply to delegate complete responsibility. The results are sometimes amazing. For example, the complete set of buildings at Richmond No. 3 yard was erected in a period of 90 days.

Ford Five

■ In Mirrors of Motordom, July 19 issue, mention was made of the 5-cylinder in-line engine developed by Ford. A Kansas reader, who prefers to remain anonymous, adds this interesting comment:

The Spanish branch of the Hispano-Suiza automobile company, Barcelona, Spain, announced sometime between 1928 and 1930 a Hispana-Suiza with ten in-line cylinders. The crank throws were spaced at 72 degrees and the claim for superior crankshaft balance as compared to the conventional 90-120 degree throw crankshafts was made.

The Ford Five (what an opportunity for the alliterationists!) is apparently a baby ten. Your statement that so far as is known the industry has never built a 5-cylinder engine is, I believe, correct.

Smoke Bombs

■ Among new war weapons are colored smoke bombs. Army Air Forces encountered difficulty in identifying the nationality of tanks and other ground units and signal flags. Very lights, smoke pots and bright markings were all tried and rejected. The answer came from the Chemical Warfare Service in the form of grenades that give off smoke in seven brilliant colors—red, orange, yellow, blue, green, violet and black. Tests reveal that the colors can be distinguished without difficulty at 10,000 feet elevation and they are used in combinations to identify such units as tanks, command posts, etc. and to facilitate exchange of signals between planes in the air and between air and ground forces. They were used, so we understand, in the North African campaign with considerable success.

South Pacific Traffic

■ On an island down in the South Pacific our boys have been given a touch of home. Steel markers guide traffic along newly built military highways which serve an advanced fighter and bomber base on the island. "US 30" and "US 70" run east and west across the island while "US 1" traverses it from north to south. "US 1" with no traffic cops, no hot dog stands, and no Sunday drivers.

Returning Service Men

■ You may recall the story STEEL ran some weeks ago on the rehabilitation and reemployment of service men by private industry. The Hudson Motor Car Co. at Detroit is setting the pace and is finding former service men to be such excellent workers and morale builders that they have asked all governmental agencies to send them as many as possible for interviews. The case history of each discharged veteran is studied to place him in the type of work for which he is best suited both physically and by education. One discharged soldier, for example, did not mention the fact that he had been injured while serving as a turret gunner in a B-26 Marauder bomber. He tried to return to his old job of riveting after receiving advanced training, but the noisy batteries of riveting guns on the production line so unnerved him that he was unable to carry on. Veterans with leg and foot wounds are given jobs which require little walking or standing.

Returned soldiers, sailors and Marines who have been wounded and who have seen their buddies killed beside them in action are outspoken about such subjects as absenteeism, strikes, careless talk and wasting of materials. Fellow workers listen to their stories about war materials being needed on the fighting fronts and give their days work that extra push that will win the war just that much quicker.

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Editorial Contents—Page 63

from the Production Lines behind the Firing Lines

A Citation for Men in War Industry

MACHINING RINGS IN ONE CHUCKING

R. J. Charlebois machines rings on a Warner & Swasey Turret Lathe at Canadian Vickers, Ltd., Montreal, Canada. The former method called for two chucking operations. In the first chucking, tubing was turned, bored to size, and cut off. In a second chucking, the rings were held in soft jaws and faced to correct lengths.

The accompanying sketch shows how operator Charlebois developed a setup to complete the job in one operation. Tubing is held in longer lengths in the chuck. A slide tool mounted in the hex turret is set up with stub boring bar to bore the hole, while an adjustable angle cutter holder turns the outside diameter. Quick adjustment to size for boring operation is made by dial on the slide tool. Dial screw on the adjustable angle cutter holder provides quick setting for turning diameter size.

A parting tool, held in the right side of the square turret cuts off rings to proper length as the turning and boring operation advances, and the finished rings drop down onto the boring bar.

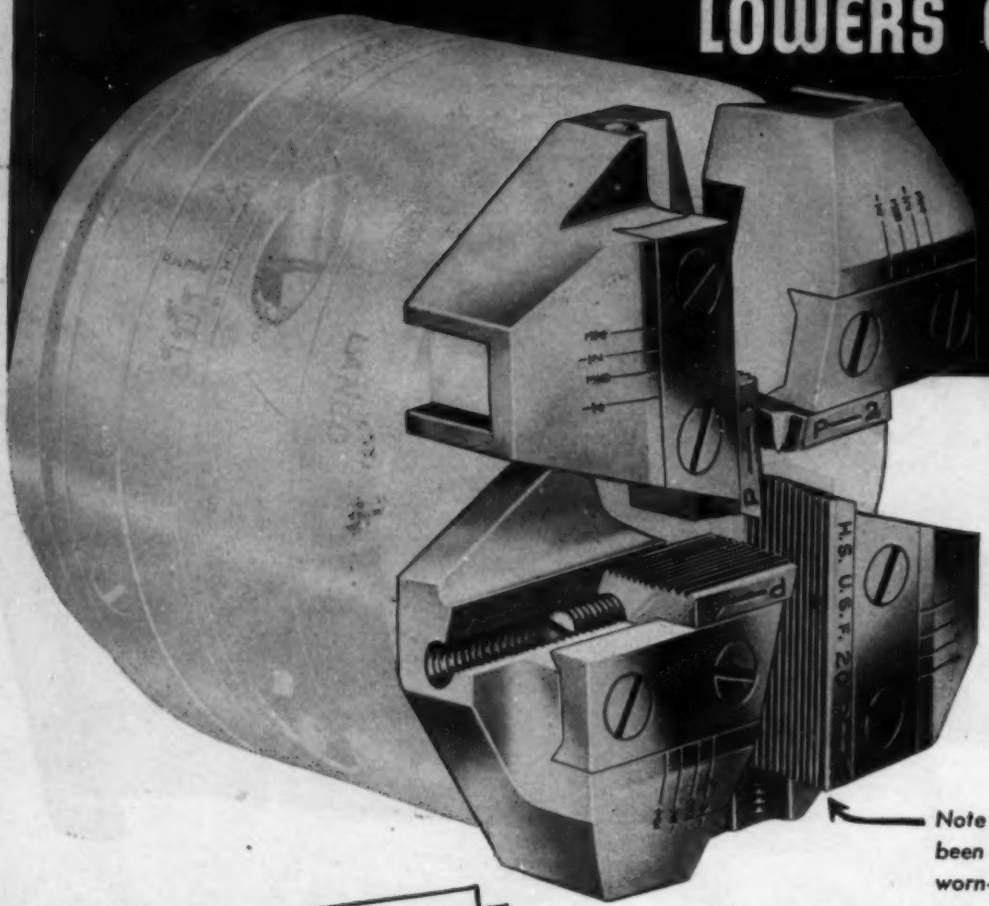
To operator Charlebois goes a gold "Ideas for Victory" Pin. Warner & Swasey has been glad to send these pins to hundreds of operators in the United States and Canada in recognition of their ingenuity and initiative in making the best use of tools and equipment at hand. Many of the ideas they have put to work in the shop, are passed along in "Blue Chips", a shop paper sent free to the homes of over 70,000 operators.

Are your operators getting "Blue Chips" regularly? We'll be glad to put their names on our list. Write Warner & Swasey, Cleveland, Ohio.

WARNER & SWASEY FOR VICTORY

YOU CAN TURN IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

INTERCHANGEABILITY OF LANDIS CHASERS LOWERS OPERATING COSTS



Note the full length chaser which has been inserted with three practically worn-out chasers to complete the set

12 Features of the LANDIS TANGENTIAL CHASER

1–Permanent throat permits close to shoulder threading throughout life of chasers
2–Rake angle range covers all machinable materials
3–Free cutting condition permits maximum cutting speeds
4–Simple grinding operation renews entire cutting edge and leading feature
5–Line contact with work lessens friction and minimizes thread distortion
6–Leading feature insures thread of accurate lead
7–Lateral absorption of cutting strain reduces vibration and chaser breakage
8–Right and lefthand threading feature reduces chaser equipment
9–Standard chasers thread all diameters with proper chaser holders
10–Interchangeability of chasers lowers operating cost
11–Chaser length provides exceptionally long life and low tool cost
12–Permanent throat gives equal distribution of cut

EACH LANDIS CHASER IS AN INDEPENDENT UNIT

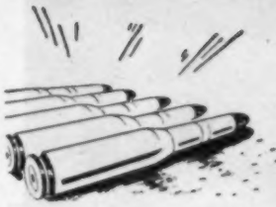
Whenever a Landis chaser is worn or damaged it can be reground or replaced without affecting the remaining chasers of the set. Each chaser is entirely independent of the other. New ones are substituted as needed, as long as the pitch, thread form, and throat remain the same, thereby insuring low operating cost.

The Finest Thread Cutting Tool in Industry

LANDIS MACHINE COMPANY

WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS



Bullets BY THE Billion

THIS SPECTACULAR anti-aircraft fire, above a city near the battle front, presents a graphic picture of our Armed Forces' expenditure of bullets literally by the billion . . . and brings home to all the need for faster and more efficient machining.

In getting the most out of machine tools and cutters, drills, reamers, boring bars, grinding wheels, etc. in producing not only bullets, but guns, planes, tanks, ships and countless other weapons, plants everywhere are using *Texaco Cutting* and *Soluble Oils.*

Texaco Cutting Oils, for example, lubricate tools, carry away the heat and prevent chip welding. Their use assures improved surface finish and maximum output per tool grind.

So effective have Texaco lubricants proved that they are definitely preferred in many important fields, a few of which are listed in the panel.

A Texaco Engineer specializing in cutting coolants will gladly cooperate in the selection of the correct grades of *Sultex, Transultex, Cleartex, Almag, Britex* or *Soluble Oils* for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

TEXACO

TEXACO CUTTING, SOLUBLE AND HYDRAULIC OILS FOR FASTER MACHINING

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT – CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

Remember it? The dim vision of masks and gowns, of lights and gleaming things? They were phantom glimpses in a troubled dream, the night your life was saved — fragments of a shining world of science and strange skills . . .

And every appliance, every gleaming instrument — every sterile garment, swab and bandage — every accessory and apparatus there in the room, that night — was the product of machine tools, or was processed on equipment built by machine tools.

From giant hydraulic presses to the finest internal grinding machines, literally hundreds of machine tools played a part, the night your life was saved.

And of all those unseen instruments that helped to save your life that night, none is more basic to the creation of *everything* that affects your life today than the internal grinding machine.

Bryant Chucking Grinder Company

Springfield, Vermont, U. S. A.

New Ampac Wins 2 to 1!

You see big differences when you compare a-c welders today. In modern features assuring you easier operation, lower upkeep, faster and better welding . . . you'll find that Allis-Chalmers' revolutionary new Ampac "200" leads by 2 to 1!

Compare 4 leading types of Transformer Welder in their Use of 11 Important Features . . .

IMPORTANT FEATURES	HOW THEY BENEFIT YOU	AMPAC "200" (Interested moving core type)	WELDER "B" (Moving coil type)	WELDER "C" (Moving core type)	WELDER "D" (Shunt type, moving core)
1 No arc blow to slow down welding.	Steady arc makes sound, uniform welds. You can weld in corners and grooves easily. Production is speeded.	YES	YES	YES	YES
2 Low striking voltage at high amperage.	Saves power for you. No need for high voltage at high currents. Raises power factor — cuts power input.	YES (65 volts)	NO (75 volts)	NO (75 volts)	NO (75 volts)
3 High striking voltage at low amperage.	Strikes arc fast. Gives you high, yet safe voltage necessary. Makes a-c welding easy at low currents.	YES (78 volts)	NO (72 volts)	NO (75 volts)	NO (75 volts)
4 Takes less than 300 sq. in. floor space.	Small size saves valuable space on crowded shop floors . . . makes it easier for you to move and handle the unit.	YES (281 sq. in.)	NO (361 sq. in.)	NO (300 sq. in.)	YES (248 sq. in.)
5 Contains less than 5 wearing parts.	Cuts maintenance to simple lubrication twice a year. Less chance for wear means longer service, lower upkeep.	YES (4 parts)	NO (8 or more)	NO (8 or more)	NO (8 or more)
6 Low original cost (no rotating element).	Simpler construction of a-c welder cuts purchase price to around 65% of what you would pay for a d-c welder!	YES	YES	YES	YES
7 Wide welding range of over 200 amperes.	You can weld thin sheets . . . yet have capacity for heavy plates, too. You can use rods from 1/16" to 1/4" in size!	YES (220 amp)	YES (215 amp)	NO (195 amp)	NO (195 amp)
8 Reconnectable for 220-440 & 208 v., 60 cycle.	Gives you full capacity at low voltages where lines are long and isolated. Can be used on *any* standard a-c voltage!	YES	NO (220 or 440)	NO (220-440 only)	NO (220-440 only)
9 Over 85% efficiency at normal loads.	You enjoy *full* benefits of a-c welding: lower power loss, high power factor, lower operating costs!	YES	NO	YES	YES
10 All settings within six control turns.	Saves welding time. Welder can make simple adjustment from high to low amperage current quickly and easily.	YES (6 turns)	NO (30 turns)	NO (50 turns)	NO (15 turns)
11 Movement of variable part 2" or less.	Cuts wear and maintenance to a minimum. Reduces hum and vibration Contributes to trouble-free operation.	YES (1 inch)	NO (9 inches)	NO (9 inches)	YES (2 inches)
		11 Ampac "200"	3 Welder "B"	3 Welder "C"	5 Welder "D"

Only Ampac gives you all 11 . . . TOTALS

ALLIS-CHALMERS AMPAC "200"

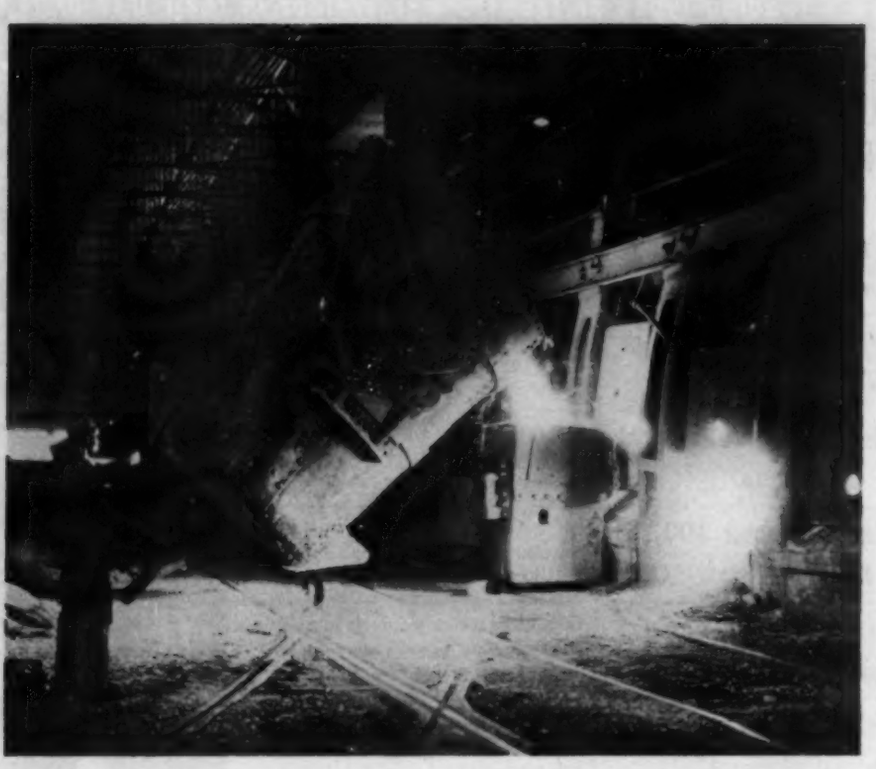
WRITE ALLIS-CHALMERS, MILWAUKEE, WIS., FOR COMPLETE INFORMATION

A1618

Weirton's "DOUBLE CONTROL" of quality

means *better steel*

for the Armed Forces



Weirton's "double control" of quality starts at the very first step in the steel-making process—that is, with the iron ore. From that point on, the combination of control by men and machines maintains quality. Each step is under the critical eyes of skilled and experienced men—men who have devoted their lives to the art and science of better steel-making.

Coupled with these masters of their craft are the most modern—the most advanced—machines and equipment that have been developed by and for the steel industry.

So, at every step, skilled men and the best machinery are combined to provide "double control" to all Weirton steel. Every man and woman at Weirton is working to see that our Armed Forces get the steel they need to speed Victory at the earliest possible moment.

WEIRTON STEEL COMPANY

Weirton, West Virginia

Sales Offices in Principal Cities

Division of

NATIONAL STEEL CORPORATION

Executive Offices · Pittsburgh, Pa.

★ *Back from a bombing mission—an engine missing—a rudder all but shot away. Under trees, on sandy deserts, our skilled Air Corps mechanics are "keeping 'em flying"—within earshot of enemy guns.*

Get 'er *Flying* in a hurry

When a mission must be carried out, there is no time to baby an airplane! The machine shop may be under a tree with the sky for a hangar roof, but the orders are: "Get 'er flying—in a hurry!"

It takes a tough ship to stand the daily pounding these missions entail. It takes a tough engine to keep that ship flying with minimum time out for repairs and overhauls. And this is the job that Pratt & Whitneys are performing—a job that is writing their fame in smoke and fire over Axis-ruled lands.

But the toughness of these engines comes, not from rugged construction—not from "beefed up" parts, but from the close tolerances to which every part is held—a precision that makes possible great strength coupled with lightness.

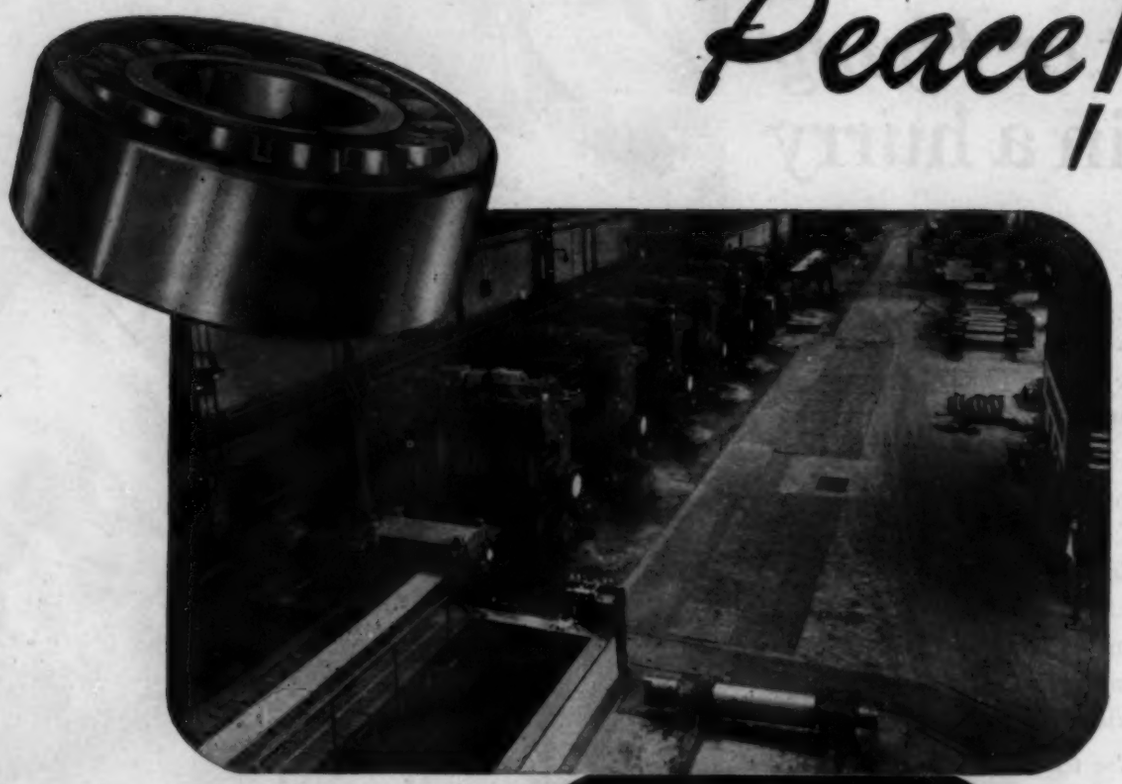
The lightweight precision gears that have been developed for this engine—gears that are today being made in huge quantities at Foote Bros.—give promise to American manufacturers of new efficiency and new economy in the transmission of power when the war is won.

FOOTE BROS. GEAR AND MACHINE CORPORATION
5225 S. Western Boulevard • Chicago, Ill.

FOOTE BROS.

Better Power Transmission Through Better Gears

FOR *War* AND *Peace!*



The SKF Back-up Roll Thrust Bearings for this 79" Hot Strip Mill were built *yesterday* during Peace, and are now working to restore it. They will still be working when Peace returns despite the fact that War-time is also "hell on bearings."

5357

SKF INDUSTRIES, INC.
PHILADELPHIA, PA.

SKF
BALL AND ROLLER BEARINGS

● SKF BACK-UP ROLL THRUST BEARING

His Responsibility . . . Accuracy

OVERNIGHT
TO ALL AMERICA . . .
FROM THE HUB OF
AIR TRANSPORTATION

A vital operation in the production of high speed metal cutting tools is the final form grinding. To produce the correct profile within the necessary close tolerances requires extreme skill and experience. To obtain accuracy of product it is essential to have tools which are engineered for the job and manufactured to a dependable degree of precision within the scope of modern inspection equipment.

For tools that are certain to give maximum efficiency and long life, specify ILLINITE.

ILLINITE
HIGH SPEED
METAL CUTTING TOOLS

- GROUND HOBS
- BROACHES
- SHAPER CUTTERS
- GEAR CUTTERS
- MILLING CUTTERS
- GROUND FORM TOOLS
- SPECIAL TOOLS

ILLINOIS
TOOL WORKS

Manufacturers of Metal Cutting Tools and Aluminum Products
2501 North Keeler Avenue, Chicago 39, Illinois
In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

HEAT-TREATING *and*
STRESS-RELIEVING *under*

Precision Control

to meet EVERY DEMAND
of your WAR-TIME PRODUCTION!

SWINDELL

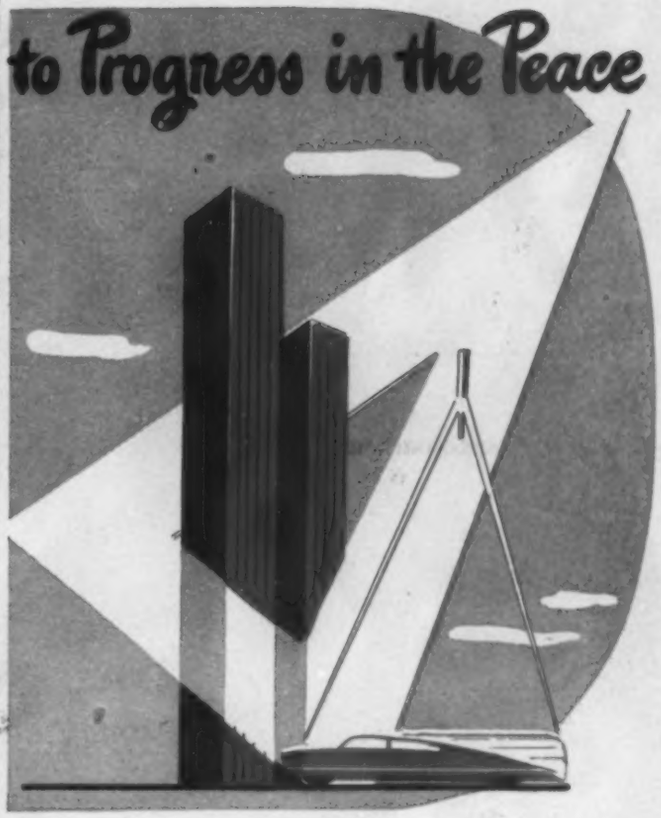
GAS FIRED
CAR BOTTOM
FURNACES

SWINDELL-DRESSLER *Corporation*
DESIGNERS AND BUILDERS OF MODERN INDUSTRIAL FURNACES
PITTSBURGH, PA.

SKILLS GEARED

to Victory in the War

to Progress in the Peace



The war has given American industry the ultimate test of its productive power. And industry has matched new requirements with new capacities—has met new problems with improved methods.

Here at Aluminum Industries, aluminum and magnesium casting techniques developed through years of experience are being further perfected to speed the victory of our fighting men. Even finer precision — even closer tolerances — are being demanded and obtained on every job.

When the present crisis is over, it will leave us with new standards of quality and service. With skills geared to wartime accomplishment, Aluminum Industries will apply itself to the problems and possibilities of a peace-time world.

ALUMINUM INDUSTRIES, INC., CINCINNATI, OHIO

Detroit: 902 New Center Building

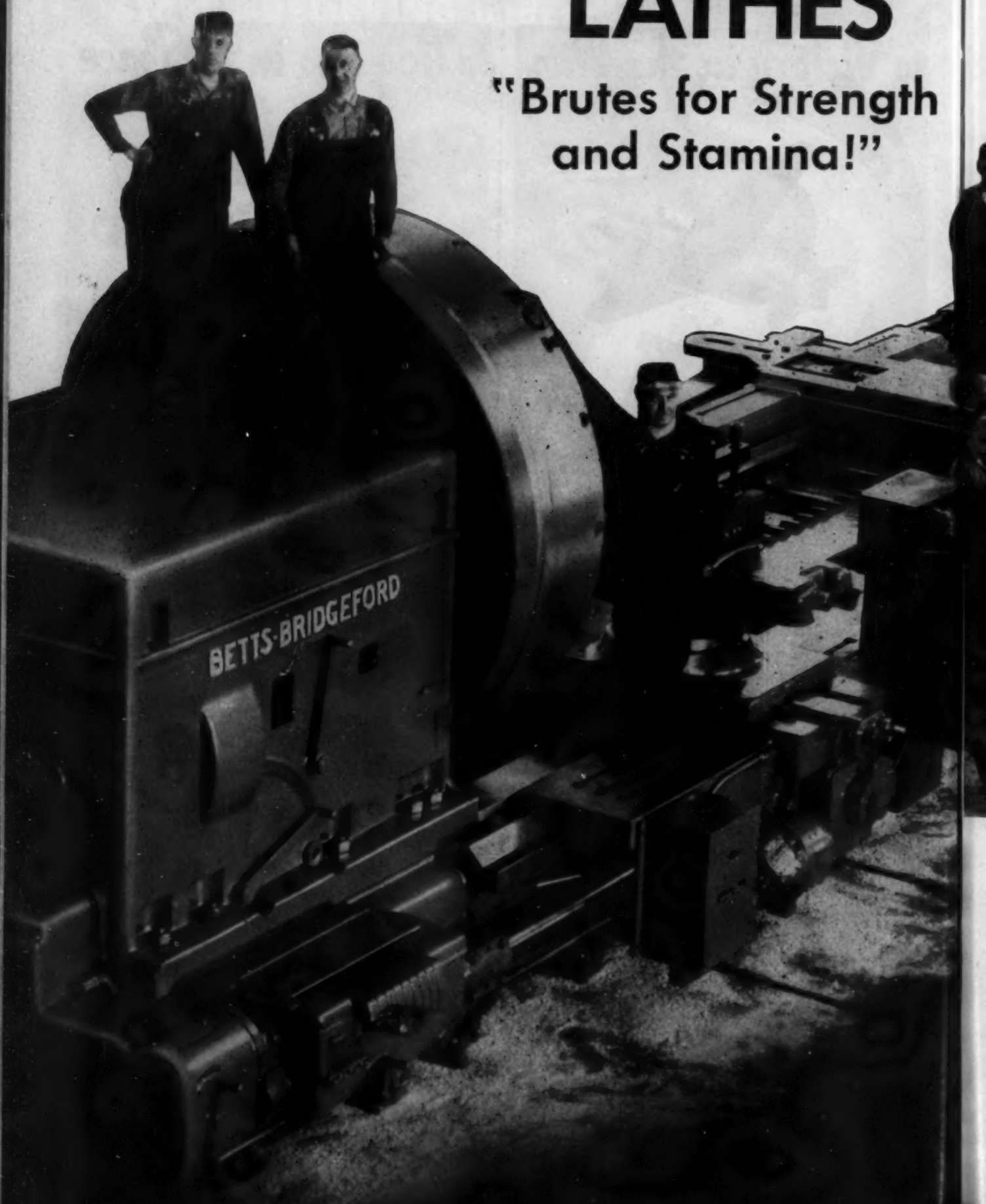
Los Angeles: 324 North San Pedro Street

Chicago: 616 South Michigan Avenue

PERMITE ALUMINUM AND MAGNESIUM ALLOY CASTINGS

BETTS-BRIDGEFORD LATHES

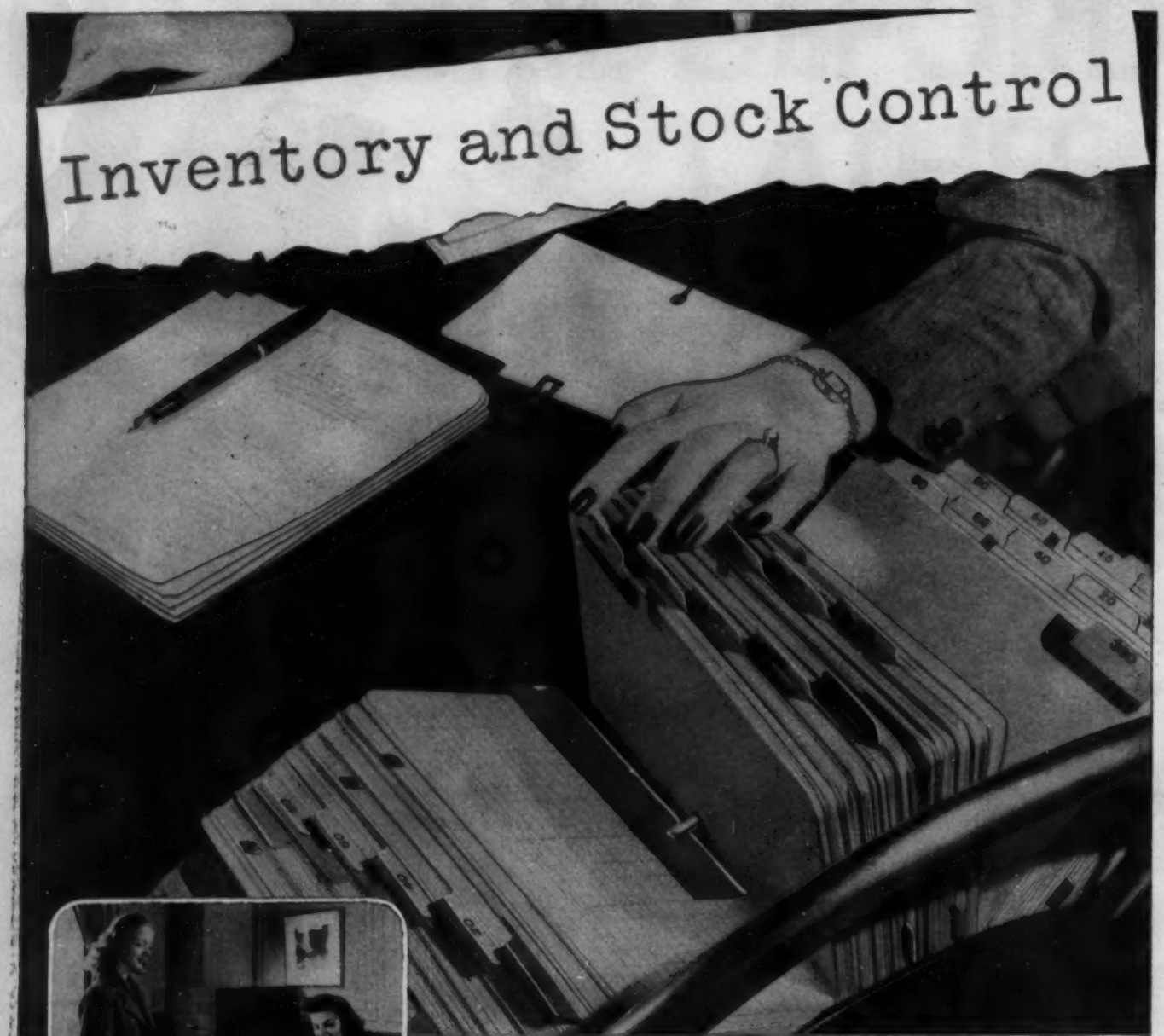
"Brutes for Strength and Stamina!"



TAKE a look at the Betts-Bridgeford Boring and Turning Lathe shown above. It will swing work 100 inches in diameter, takes 70 feet between centers and will bore 25 feet in length. Big, powerful and versatile, it is typical of all Betts-Bridgeford lathes. Capable of maintaining accuracy even under the most severe service throughout their long life, Betts-Bridgeford lathes are *brutes for strength and stamina.*

These lathes are built in sizes from 26 inches swing and up, the larger ones handling work 144 inches and more in diameter. We also build special-purpose lathes to meet practically any requirement. Send us your next lathe inquiry.

CONSOLIDATED
MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK



Facts come quickly from Cardineer. A slight pull on the hand ring and 6000 records parade their data.

WITH *Cardineer* YOU CAN SIGNAL ON 3 SIDES OF CARD

● With full visibility of both sides as well as top of cards, Cardineer offers outstanding advantages for focusing attention on specific records for special action. Metal signals may be used on top or either side. Special Cardineer flashers, punched so they extend half an inch, either side, are extremely handy. Tabs may be written upon and the flashers discarded after they have served their purpose. Supplied in seven colors. Special cards with side tabs are also available. With these devices Cardineer gives perfect control of materials and production —with a 40% to 60% saving in time, space and labor.

Write for complete information and ask for any of the following free booklets: Inventories ☐, Costs ☐, Payroll & Personnel ☐, Plant & Equipment ☐, Purchases ☐, Production ☐. Check and pin this to your letterhead.

DIEBOLD, INCORPORATED • CANTON 2, OHIO

Formerly Diebold Safe & Lock Company • Branch Offices in Principal Cities

PRODUCERS OF METHODS EQUIPMENT AND OFFICE ACCESSORIES

DIEBOLD *Cardineer* ROTARY FILE

More Guns where they're needed

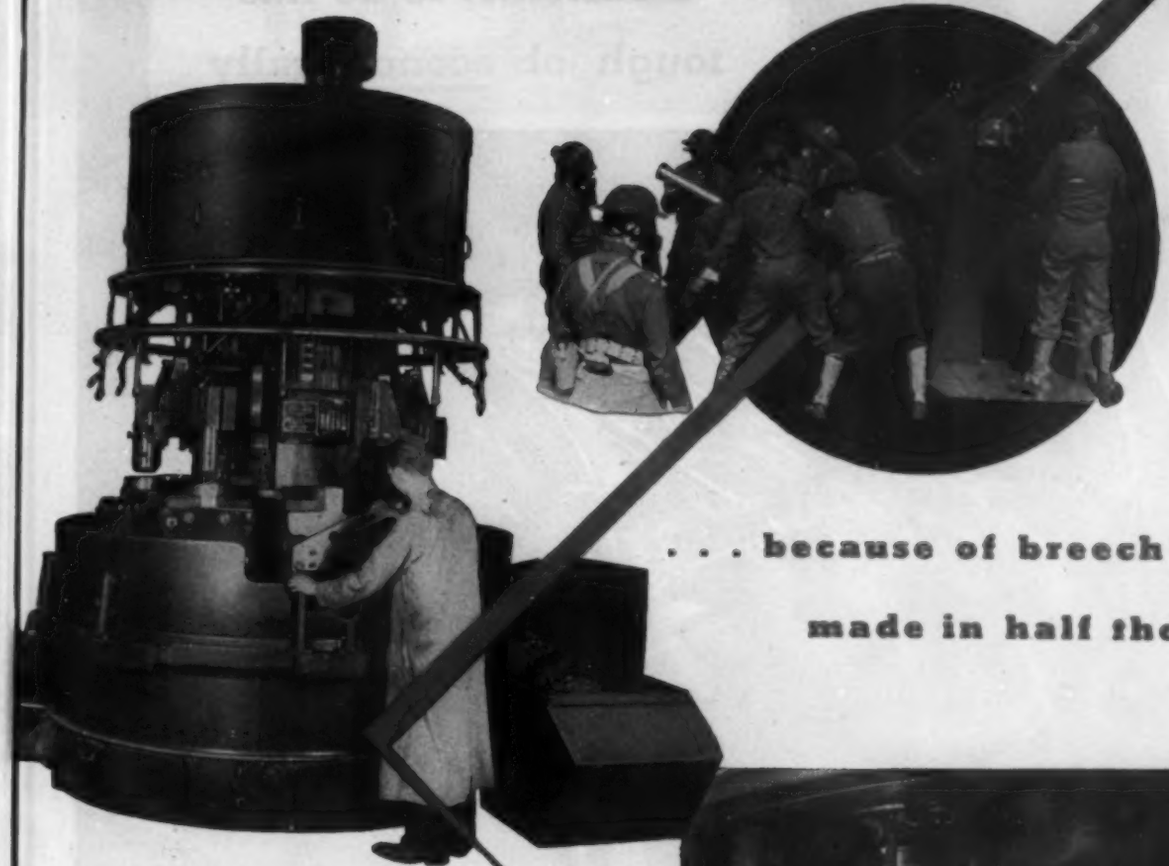
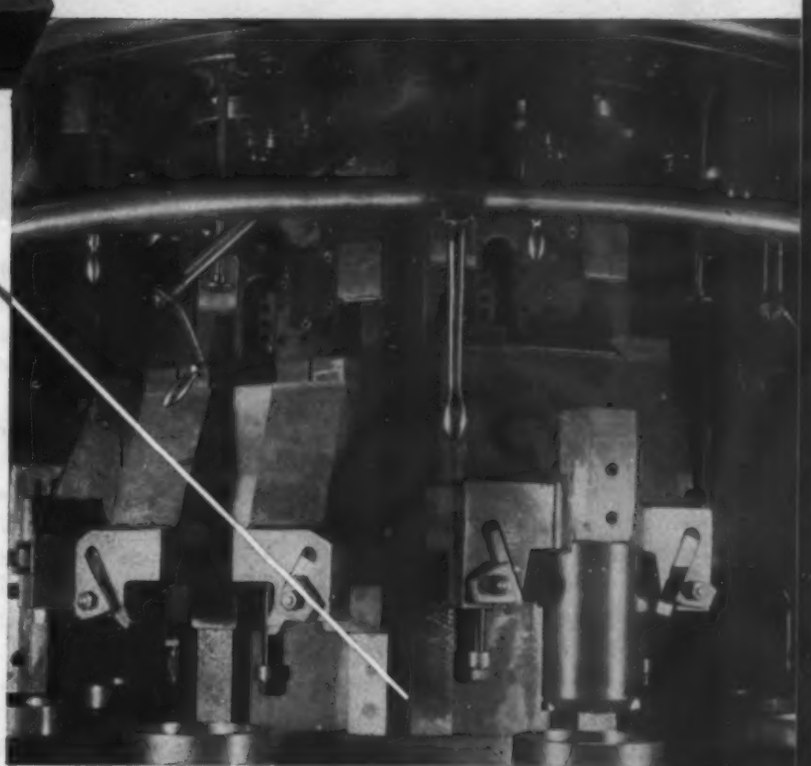


Photo by
U. S. Army Signal Corps

. . . because of breech rings made in half the time



• There's no substitute, at the front, for "more guns".

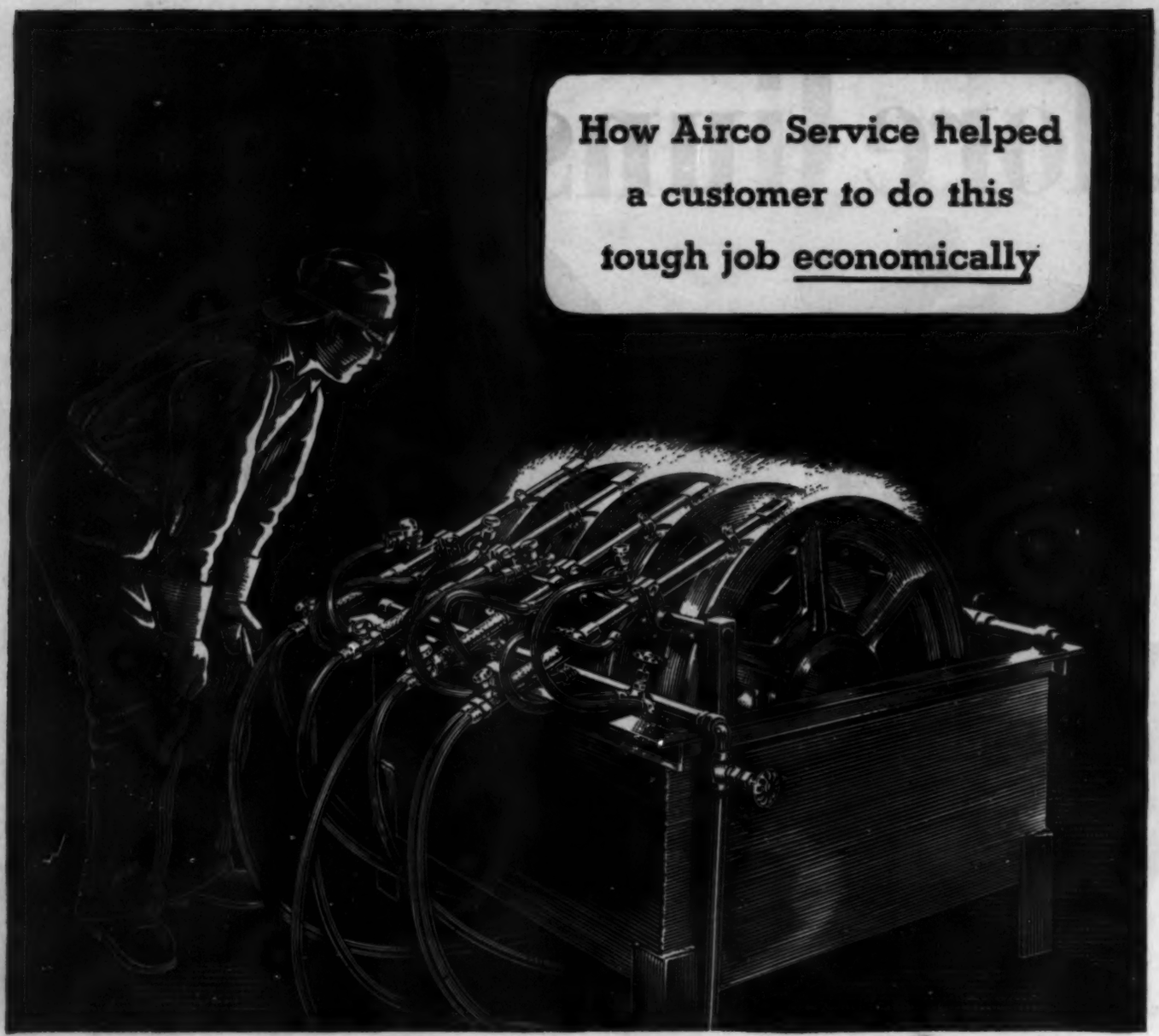
And one of America's plants is now shipping more guns—many more—since they put the breech ring job on 2 Mult-Au-Matics. Now the breech rings are ready for the assembly line in less than half the old time—completely bored, faced, turned, and finished!

Mult-Au-Matic accuracy contributes still further saving of time, by facilitating later operations. Production is constant, with no time out for maintenance or repairs.

Today, Mult-Au-Matic performance is speeding guns, tanks, planes in the numbers we need. Tomorrow, they will be instantly ready to speed your peace-time production.

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

How Airco Service helped a customer to do this tough job economically



THE Brewster Company, Shreveport, Louisiana, had an unusual production problem. Specifications on a large order for drilling equipment called for one of the products—cable sheaves—to be flame hardened in the cable grooves.

This contract requirement raised three difficulties—hardening had to be limited to the grooves; a means of handling the difficult shapes had to be found; and the job had to be done quickly, efficiently, and economically.

Standard methods were not practicable in this case. This is why the Brewster Company called in Air Reduction engineering specialists to help work out a special production set-up. The result was an unusual but simple fixture designed and built by the Air Reduction men. This effective production jig enabled the manufacturer to meet his specifications and schedules, and at the same time save considerable expense.

This case is typical of many frequent occasions where Air Reduction's specialized "know how"—teamed with a customer's manufacturing skill—has successfully overcome troublesome production problems. This same constructive engineering assistance is available without charge to every user of Air Reduction products.

If you have a problem involving some use of the oxyacetylene flame and electric arc, Air Reduction's engineering and research personnel will be glad to help you. For further information write your nearest Air Reduction office.

AIR REDUCTION

General Offices:

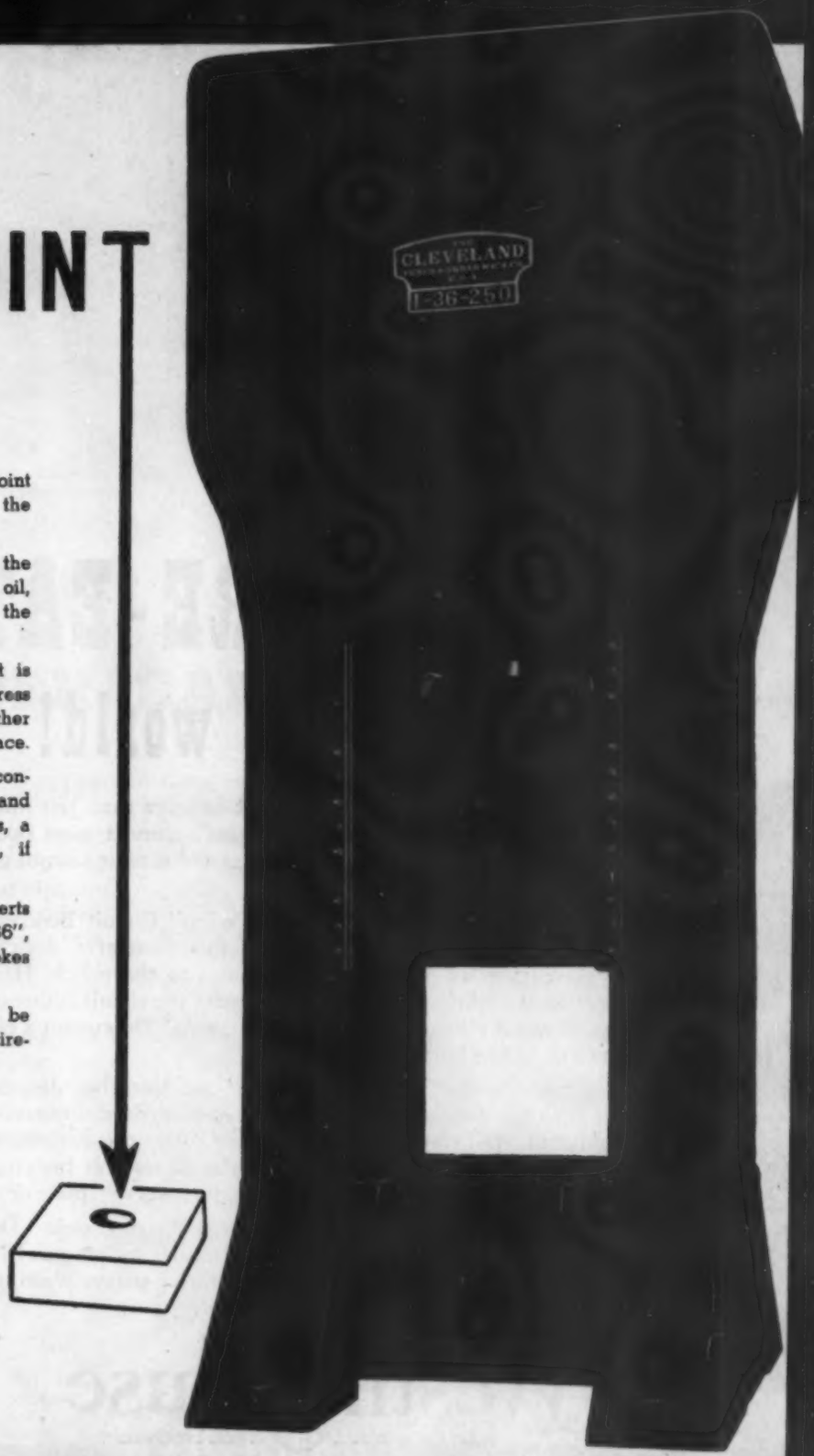
60 E. 42nd STREET, NEW YORK 17, N.Y.

In Texas:

Magnolia-Airco Gas Products Co.
General Offices: HOUSTON, TEXAS
OFFICES IN ALL PRINCIPAL CITIES

MODERN CLEVELAND PRESSES

SINGLE POINT



THIS illustration shows a Cleveland Single Point Press which has one connection located in the center of the slide.

The Press is single geared with twin drive to the shaft and the gearing, which runs in a bath of oil, is located in the box type crown together with the drive unit.

This arrangement of the gears and drive unit is similar to that of the Two Point and Four Point Press and eliminates all overhanging brackets or other projections, thereby conserving valuable floor space.

The Press is arranged with an electrically controlled, pneumatically operated friction clutch and brake but, as with all other Presses of this series, a hydraulically operated clutch can be furnished, if desired.

This 1-36-250 Cleveland Single Point Press exerts a pressure of 250 tons, has a bed area 42" x 36", a stroke of 12" and operates at the rate of 30 strokes per minute.

However, Cleveland Single Point Presses can be furnished in sizes and capacities to suit requirements.

THE CLEVELAND PUNCH & SHEAR WK'S CO. U. S. A.

THE CLEVELAND PUNCH & SHEAR WORKS CO CLEVELAND·OHIO

the greatest "FIRE-EATING" act in the world!

A circuit breaker must do more than just interrupt the circuit when overloads occur. It must open the circuit *before* danger strikes and it must control the arc that results.

The Westinghouse "De-ion" Circuit Breaker does both these jobs. First, this protective device outguesses the current; beats dangerous disturbances to the punch. Harmless overloads are passed without interruption—but once the circuit is threatened, the sensitive Bi-metal element goes into action, *quick!* The current's broken, the arc quenched, in the blink of an eye.

Second, it controls the arc. The "De-ion" arc quencher divides and extinguishes it so fast that arc burns and pits are minimized. Contact life is greatly lengthened. And service is easily restored. Once the disturbance has been corrected, a simple flip of the indicating handle restores the circuit in seconds. No long waits for the maintenance man; no parts to replace or repair.

Protect your vital equipment and circuits with Westinghouse "De-ion" Circuit Breakers. Ratings up to 600 amperes; enclosures for practically every type of service. Call your Westinghouse representative today. Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N. J-21285

"THE BIG BUILD-UP"

is provided by this Westinghouse Bi-metal element. Two metals which react differently under heat are bonded together. Threatening overloads cause this Bi-metal to bend, tripping the interrupting mechanism, opening the circuit.

THE GREAT "DE-ION"

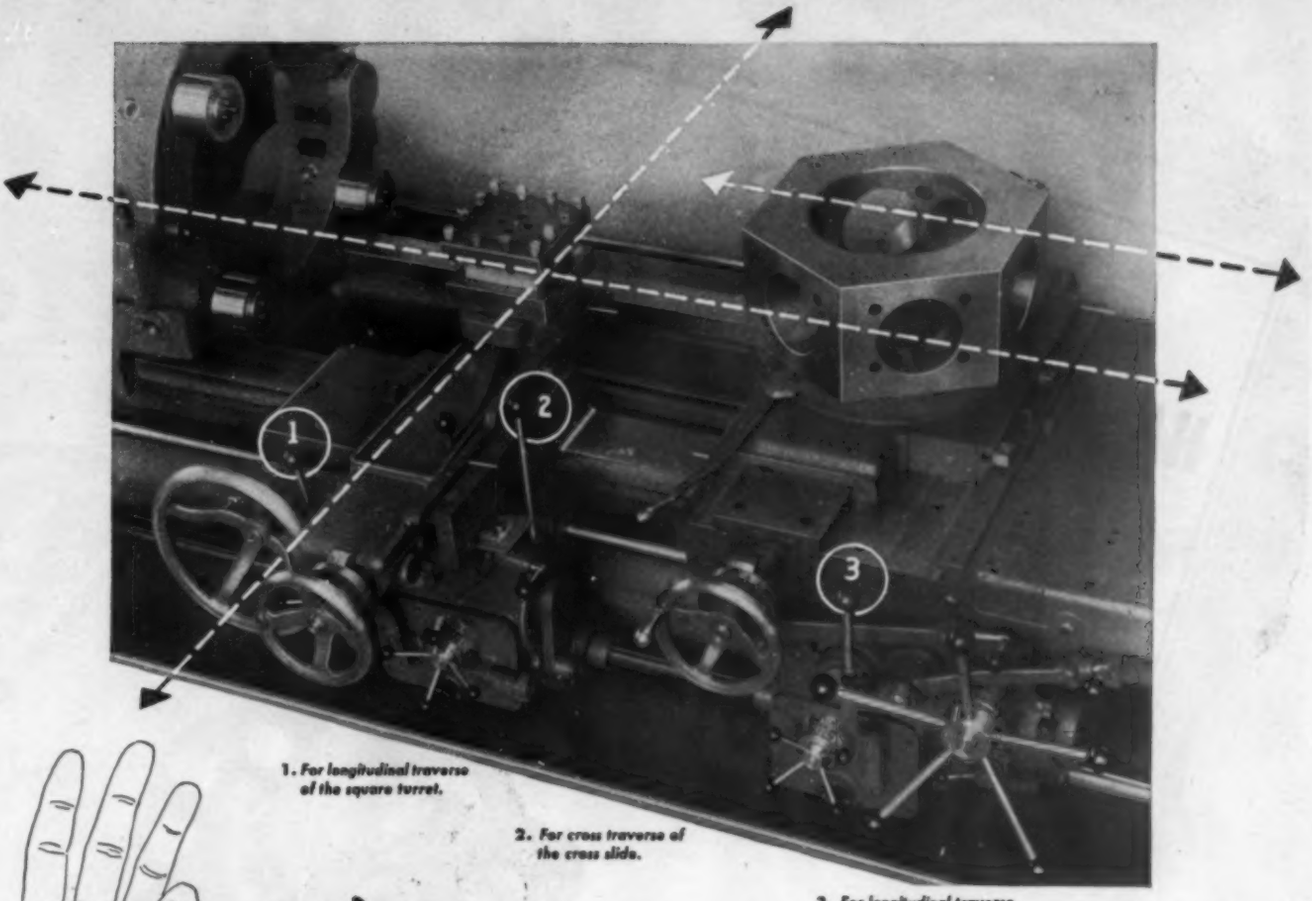
quenches the arc. Made of parallel metal plates in the form of a grid, this "De-ion" arc quencher draws the arc into the chamber, divides it into segments, smothers it between the plates . . . all in the space of half a cycle.

Westinghouse

PLANTS IN 25 CITIES ... OFFICES EVERYWHERE

"DE-ION" CIRCUIT BREAKERS

AN EXCLUSIVE GISHOLT ADVANTAGE



1. For longitudinal traverse of the square turret.

2. For cross traverse of the cross slide.

3. For longitudinal traverse of the hexagon turret.

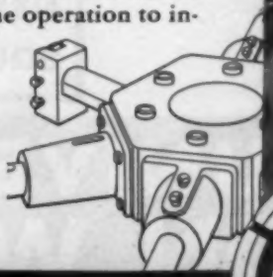
"3 Way" POWER RAPID TRAVERSE

...aid to war production

There's no half measure about Gisholt's Power Rapid Traverse, provided not only for the longitudinal travel of *both* the square and hexagon turret carriages, but also for the in and out movement of the cross slide. These traverses, standard on Gisholts, bring the tools more quickly into position preliminary to actual cutting operations. They may be operated simultaneously or independently in either direction.

This quicker positioning of cutting tools reduces time between cuts, and conserves the operator's energy for productive work. The potent influence on the day's production of these aids to easy operation is readily appreciated by observing the frequency, ease and safety with which they are used by operators.

Gisholt's *complete* Power Rapid Traverse is but one of many features which speed-up turret lathe operation to increase war production now—and to cut costs afterward.



GISHOLT MACHINE COMPANY
1217 E. Washington Ave., Madison, Wis.

Look Ahead . . . Keep Ahead . . . With Gisholt Improvements in Metal Turning

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

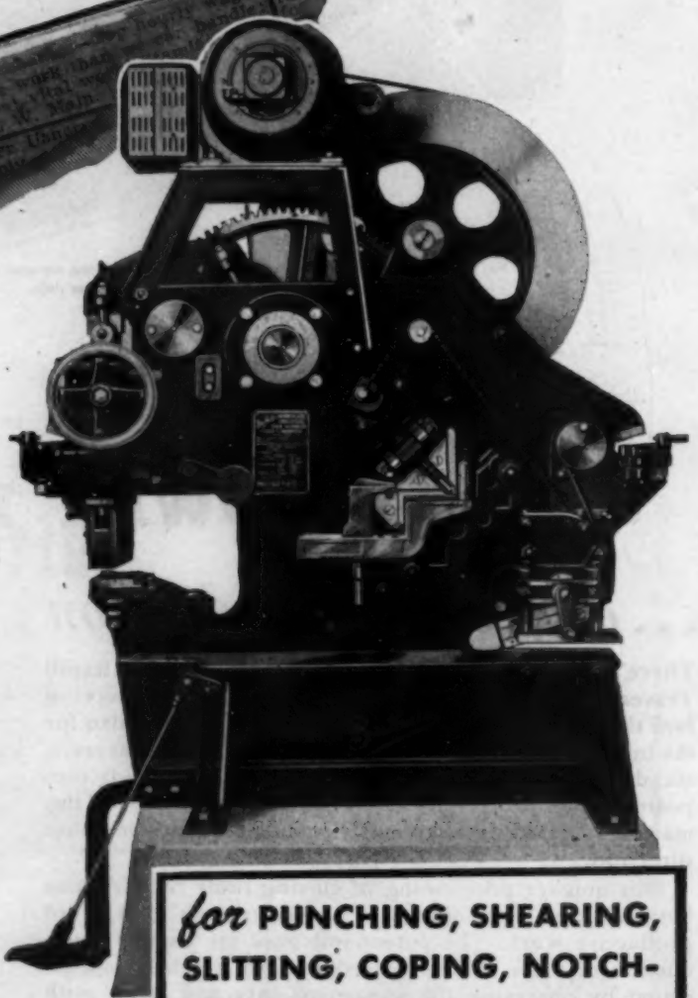
There's never a lag in the built-in capacity of Buffalo Universal Iron Workers to handle the toughest fabrication jobs on a 24-hour-a-day schedule. The efficiency of these versatile tools makes every man hour "pay-off" in terms of maximum production. Designed for ease of control and unfailing accuracy plus speed of output, Buffalo Universal Iron Workers are meeting urgent war needs *on time*.

★

BUFFALO FORGE COMPANY

158 Mortimer St. Buffalo, N. Y.

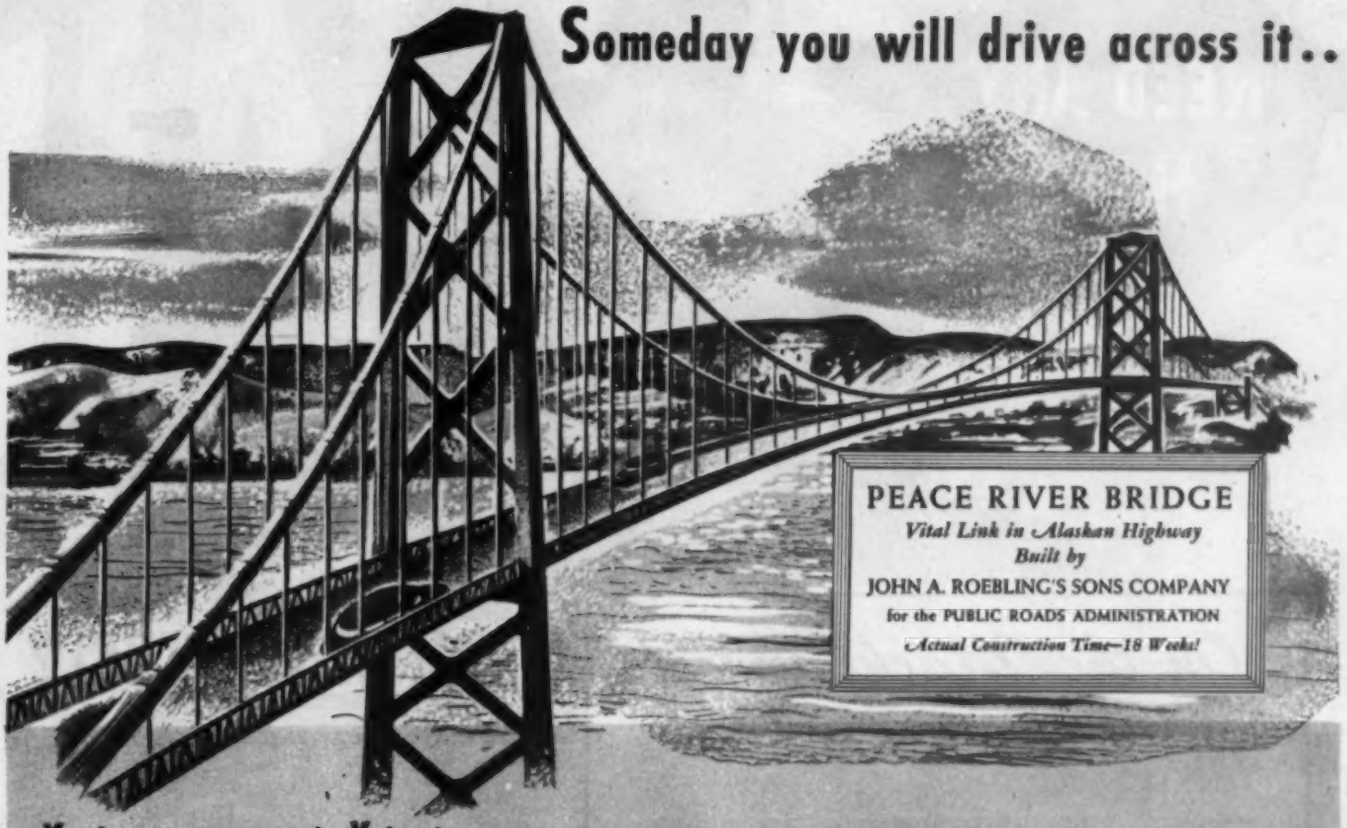
Canadian Blower & Forge Co., Ltd.
Kitchener, Ont.



for **PUNCHING, SHEARING, SLITTING, COPING, NOTCHING of ANGLES, TEES, CHANNELS, I-BEAMS, ROUNDS, SQUARES, FLAT STEEL . . . .**

"Buffalo" UNIVERSAL IRON WORKER

Someday you will drive across it..


PEACE RIVER BRIDGE
Vital Link in Alaskan Highway
Built by
JOHN A. ROEBLING'S SONS COMPANY
for the PUBLIC ROADS ADMINISTRATION
Actual Construction Time—18 Weeks!

You're going to see the Yukon!

YOU BREAKFASTED in Dawson Creek, and now your car hums along the smooth Alaskan Highway, through the wide, pine-studded country of British Columbia. Around a curve, and suddenly, before you stretches the valley of the Peace River, spanned by one of man's most beautiful works . . . the suspension bridge. "Here's a bridge," you'll say to the family, "that helped to win the war."

You may stop a moment beside the bridge's approach, to tell them more about it. "That's a lot of river," you may say. "Two thousand feet wide, running 8 miles an hour! And here in the wilderness, a great bridge . . ."

"How ever did they get it here?" your wife asks, ever practical. "Well," you say, "it's 40 miles from rail, at Dawson Creek. They trucked it here,—100 freight car loads of material and equipment—not in balmy summer weather either. It was in the winter and spring of 1943. Bitter cold, snowing, blowing . . ." And before it reached Dawson Creek lay the urgent, anxious period of design, details, orders, priorities, manufacture and shipment, all compressed into the unbelievably short time of 18 weeks, an achievement made possible by the most complete co-operation between Roebling and the U. S. Public Roads Administration with the timely assistance of the U. S. Engineers when special priorities were required.

"There wasn't much here when the men arrived. Roebling carpenters built weather-tight shacks for the men. Roebling men cut wood for Roebling cooks who kept their stoves heated red. Disease struck, and at one time eighty men were down. From Trenton, medicine was packed, and flown by plane . . ."

"Was the river frozen?" Johnny queries.

"It was frozen fifty-four inches thick. 4½ feet of ice. So they used the ice—built their construction tower on it. Because it was the fastest way. But they gambled, for they knew the ice would thaw. The break-up would come in March. *Ice unsafe after March 15 and almost certain to be dangerous by April 1.* That was the report.

"They raised one bridge tower, then skidded their 100-ton construction tower across the ice to raise the other one. Just like a sled. They had to hurry. But they won.

"After the break-up, the bridge towers stood safely pointing to the sky. They needed motorboats, but there were none. They built them. The 'John A. Roebling' and the 'Washington Roebling,' named for America's bridge-building pioneers, helped the Army ferry as they worked to build the bridge. One operation followed another in rapid succession as Roebling, working hand in hand with P. R. A. field men maintained the tempo and rushed the bridge to completion."

"This bridge was so vital," you continue, "that as soon as the cables were spun across, they carried a gasoline pipe-line over on them. Trucks shuttled to one end of it, and from the other end toward the Alaska-based bombers and fighters,—and Tokyo . . ."

You swing your car onto the bridge and purr along, a hundred feet above the swift Peace River. "They finished it in record time. In August, 1943 . . ."

"Surpassing their 100 year record as bridge builders, Roebling has done a magnificent job at Peace River," says Commissioner Thomas H. McDonald of U. S. Public Roads Administration. "Construction is complete . . . 7½ months after the contract's signing . . . 18 weeks after the setting of the first piece of steel . . . cutting in half the best previous construction time!"

If you would like to read more of this Roebling saga, and own a color reproduction of the Peace River Bridge, write today. John A. Roebling's Sons Company, Trenton 2, New Jersey.

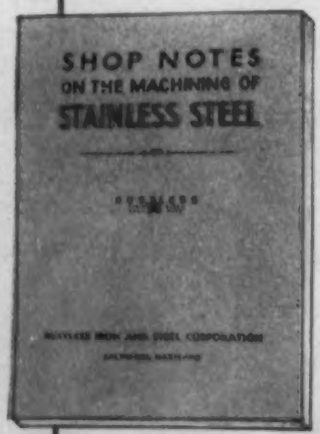
JAR ROEBLING

Bridge Builder . . . Pacemaker in Wire Products **ROEBLING**

On the Machining of STAINLESS STEEL?

Stainless Steel is "tough stuff". That is what has won it a place on so many Specifications. Naturally, Stainless offers machining problems. We know, because we are the largest makers of Stainless Steel and the only company making it exclusively.

We know, too, that you may have new men who may not be familiar with Stainless techniques. For that reason we have printed *"Shop Notes on Machining of Stainless Steel"*, to help your men do a better job. After exhaustive research and actual shop tests, this manual was compiled from the personal experience of our own machinists, specialists on Stainless Steel. (As a matter of fact, every man in the Rustless Iron and Steel Corporation is a Stainless specialist. That is his one job . . . to manufacture and apply Stainless Steel.)



Let us know how many copies of this manual you can use. They will be sent you without charge.

If Your Problem Is Urgent . . . Ask RUSTLESS by phone.

Call Wolfe 5400
Baltimore, Maryland

IF YOU WANT TO KNOW ABOUT STAINLESS...

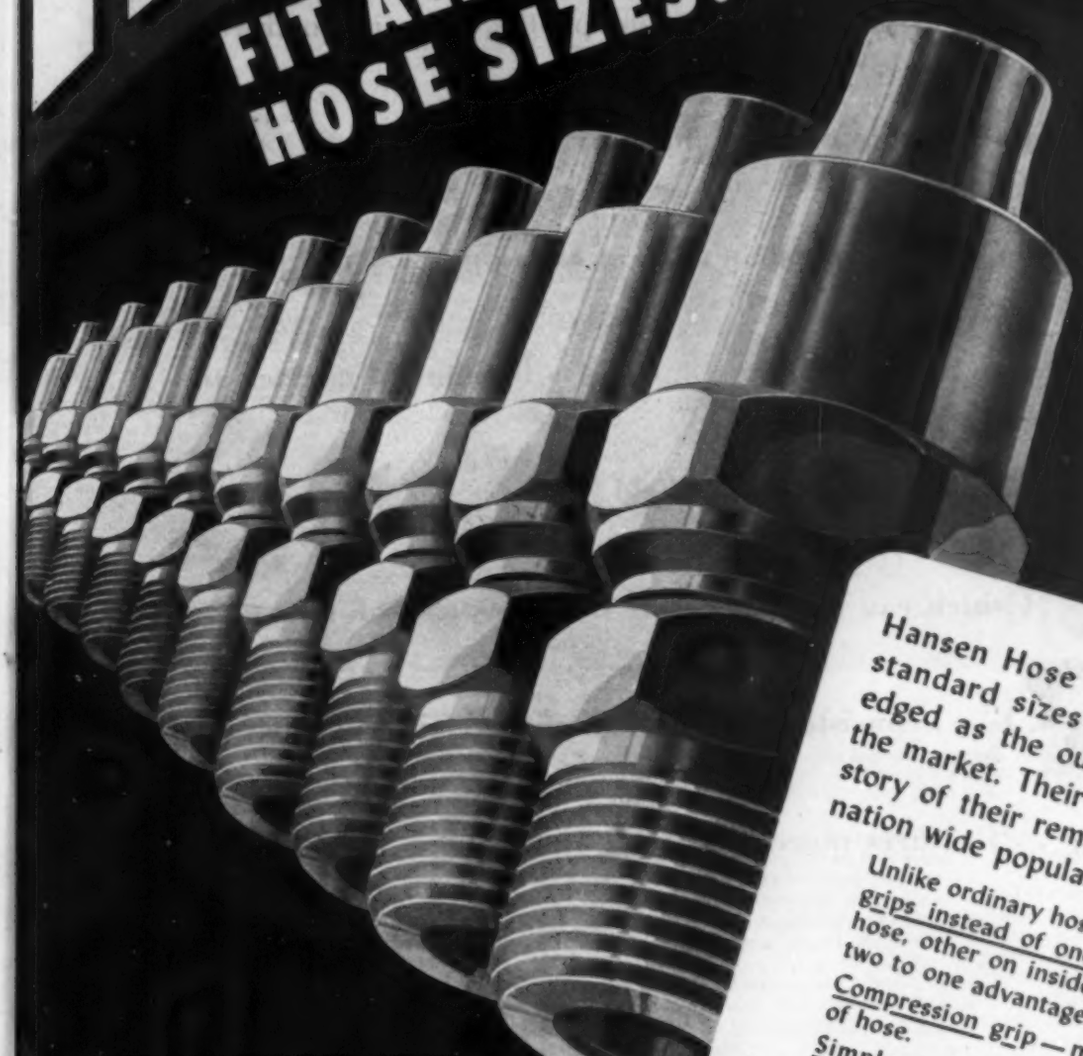
RUSTLESS
CORROSION AND HEAT-RESISTING
STAINLESS STEELS

RUSTLESS IRON AND STEEL CORPORATION, BALTIMORE, MARYLAND
Producing STAINLESS STEEL *Exclusively*

SALES OFFICES: BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • LOS ANGELES • NEW YORK • PHILADELPHIA • DISTRIBUTORS IN PRINCIPAL CITIES

HANSEN HOSE CLAMPS

FIT ALL STANDARD HOSE SIZES!



Hansen Hose clamps can be used on all standard sizes of hose and are acknowledged as the outstanding hose clamps on the market. Their exclusive features tell the story of their remarkable performance and nation wide popularity.

Unlike ordinary hose clamps they have two grips instead of one . . . one on outside of hose, other on inside of hose . . . a distinct two to one advantage.

Compression grip — no tearing or cutting of hose.

Simple and easy to install, requiring no special tools.

Economical — can be used many times over.

Extra long stem . . . protects and prolongs the life of the hose.

Safe working pressure of 500 pounds.

Neat, trim and tailored.

Send for free catalog on Hansen Industrial Air Line Equipment

THE HANSEN MFG. CO.
1786 EAST 27th STREET • CLEVELAND, OHIO

HANSEN
INDUSTRIAL AIR LINE EQUIPMENT

AIR HOSE COUPLINGS • HOSE CLAMP SOCKETS • HOSE CLAMPS
AIR BLOW GUNS • HOSE CLAMP PLUGS • ENGINE CLEANERS
SANDBLAST CLEANERS • AIR-LIQUID SPRAY GUNS

BATTLE COMING UP...

In the days to come ... when the peace is won

... the battle of product survival will just be starting

For the benefit of your products and profits, here is worthwhile information about a versatile material now in front-line duty

... CMP precision cold rolled strip steel in coils up to 24 inches wide and up to 300 pounds per inch of width in all carbon and alloy grades ... closest tolerances are held ... even in THINSTEEL (which can be rolled 1/3 the thickness of newspaper stock) ... consistent fulfillment of all rigid specifications ... assures more feet per pound, more finished parts per 100 lbs.

For complete information have a talk with a CMP representative or write The Cold Metal Products Co., Youngstown, Ohio.

FIRST ASSISTANT TO THE MAGNAFLUX* INSPECTOR

"Magnaflux Service"

MAGNAFLUX RESEARCH

Since the pioneering stage of the original Magnaflux Method for steel, our engineers have sought to extend the benefits of *rapid non-destructive* inspection techniques in every field. For the important welding industry special portable equipment and new procedures for more sensitive results were developed. Magnaglo, recently announced, extends the usefulness of magnetic inspection. Zyglo is a new method of tremendous possibilities for the inspection of aluminum, magnesium and other non-magnetic and non-metallic materials.

And still the laboratory looks ahead.

Filling a highly essential place in the war effort are many hundreds of key men on production lines who work as Magnaflux Inspectors. They perform a function that was impossible in all former wars. It is their job to reject in advance the parts that would fail in storm or combat or some unforeseen emergency. But the failure is foreseen—in the factory—before priceless time and labor are added to the defective part.

The special skill of these men is to bring out and interpret indications of flaws by the non-destructive methods of the Magnaflux Corporation and to point out production errors so as to correct the causes of bad parts. In the phenomenal expansion of industry for war production a small army of Magnaflux* Inspectors has been required. New problems have been encountered, new methods developed and Magnaflux* Inspection has become standard practice in a rapidly rising percentage of all plants.

This unfaltering contribution to American arms of Magnaflux* Methods has been possible only through a policy adopted early in the Corporation's twelve year history—a policy of *continuing service*. All Magnaflux experience in the research laboratory, in users' plants and in special contacts of field engineers is shared. Special bulletins, text books, centralized laboratory service and regularly scheduled traveling schools serve to pool the latest discoveries for all users.

Thus "Magnaflux" is more than a method, more than the specialized equipment for applying it. The word designates a Corporation dedicated to development of higher industrial efficiency through widespread adoption of better inspection.

Magnaflux—a registered trade mark descriptive of inspection methods, materials and equipment of Magnaflux Corporation

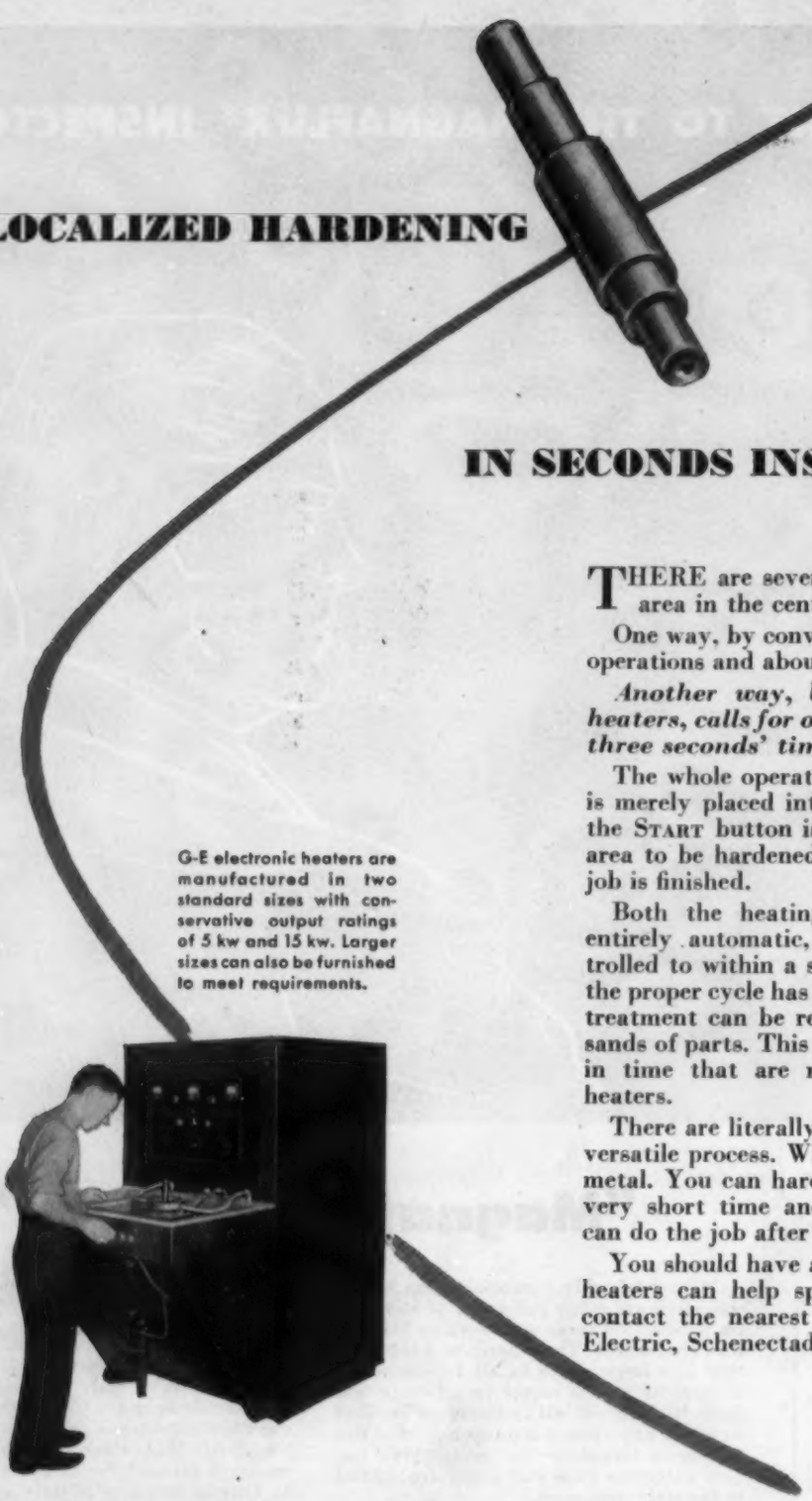
MAGNAFLUX CORPORATION

5912 Northwest Highway, Chicago, Illinois

NEW YORK • DETROIT • LOS ANGELES • DALLAS

LOCALIZED HARDENING

IN SECONDS INSTEAD OF HOURS!



G-E electronic heaters are manufactured in two standard sizes with conservative output ratings of 5 kw and 15 kw. Larger sizes can also be furnished to meet requirements.

THERE are several ways you can harden a limited area in the center of this small, steel shaft.

One way, by conventional methods, may require five operations and about ten hours' time in process.

Another way, by the use of G-E electronic heaters, calls for only one operation and less than three seconds' time!

The whole operation is amazingly simple. The shaft is merely placed into a fixture within the heater coil, the START button is pressed, and almost instantly the area to be hardened is heated and quenched, and the job is finished.

Both the heating and the quenching cycles are entirely automatic, the hardened zone can be controlled to within a small fraction of an inch, and once the proper cycle has been established, *exactly* the same treatment can be repeated time after time for thousands of parts. This is typical of the remarkable savings in time that are made possible by G-E electronic heaters.

There are literally thousands of applications for this versatile process. With it you can heat practically any metal. You can harden, anneal, braze, or solder—in a very short time and with great accuracy. Operators can do the job after one or two hours of training.

You should have all the facts on how G-E electronic heaters can help speed up *your* production. Simply contact the nearest G-E office, or write to General Electric, Schenectady, N. Y.

● *Electronic heating is a new and powerful tool to help speed American war production. Like most new tools, it can easily be misapplied. The recommendations of G-E Industrial Heating Specialists are based on the experience gained with more than two hundred installations of electronic heaters, plus a quarter century of experience in the development, manufacture, and application of electric heating equipment of all types.*

GENERAL ELECTRIC

ELECTRONIC HEATERS

The best investment in the world is in this country's future—
BUY WAR BONDS

TO HELP YOU *get best results in* WELDING STAINLESS STEEL

Republic metallurgists and engineers prepared this book for YOU—to help you weld Republic ENDURO Stainless Steel soundly and economically on a steady production basis.

It contains twenty pages of useful information based on Republic's many years of pioneering stainless steel and wide experience in the production and fabrication of this metal. It covers electric arc, spot, projection, atomic hydrogen, gas, flash and seam welding.

It discusses the various analyses, their relative welding qualities and precautions to exercise. It contains diagrams of joint set-ups. It includes brazing and silver soldering. And it contains a two-page chart showing physical, electrical, mechanical, heat-treating, heat-resisting, machining and drawing or stamping properties of the popular analyses.

This book has proved a very useful and valuable aid to thousands of users of stainless steel—and will do the same for you. Write us for a copy—and, if you are interested in other methods of fabrication (stamping, drawing, machining, forming, etc.), ask also for a copy of "The Fabrication of Republic ENDURO Stainless Steel". Either or both books will be sent promptly.

REPUBLIC STEEL CORPORATION
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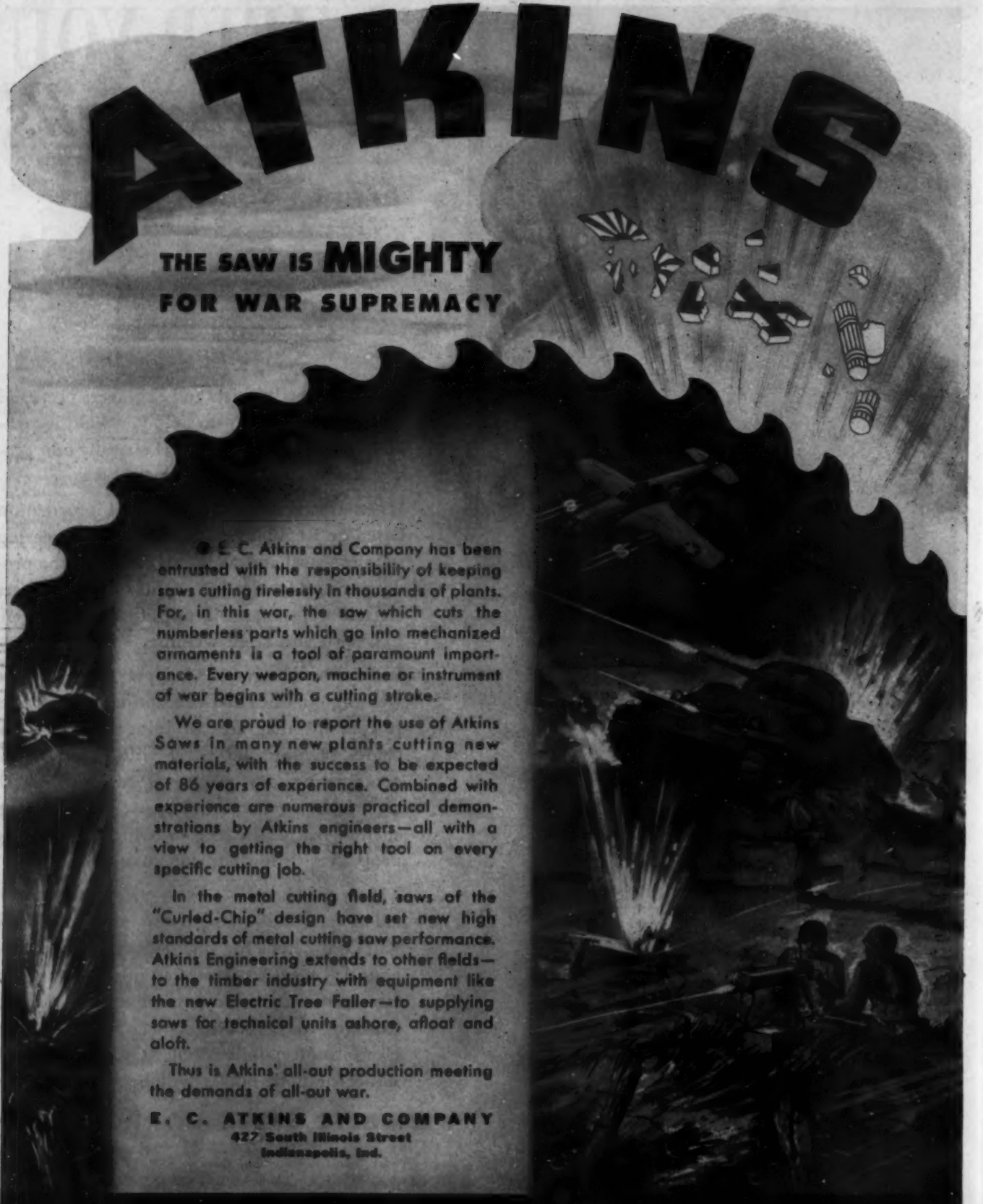
REPUBLIC *Enduro* STAINLESS STEEL

*Reg. U. S. Pat. Off.

Other Republic products include Pipe, Sheets, Upson Quality Bolts and Nuts, Electrunite* Condenser and Heat Exchanger Tubes

ATKINS

THE SAW IS MIGHTY FOR WAR SUPREMACY



E. C. Atkins and Company has been entrusted with the responsibility of keeping saws cutting tirelessly in thousands of plants. For, in this war, the saw which cuts the numberless parts which go into mechanized armaments is a tool of paramount importance. Every weapon, machine or instrument of war begins with a cutting stroke.

We are proud to report the use of Atkins Saws in many new plants cutting new materials, with the success to be expected of 86 years of experience. Combined with experience are numerous practical demonstrations by Atkins engineers—all with a view to getting the right tool on every specific cutting job.

In the metal cutting field, saws of the "Curled-Chip" design have set new high standards of metal cutting saw performance. Atkins Engineering extends to other fields—to the timber industry with equipment like the new Electric Tree Faller—to supplying saws for technical units ashore, afloat and aloft.

Thus is Atkins' all-out production meeting the demands of all-out war.

E. C. ATKINS AND COMPANY
427 South Illinois Street
Indianapolis, Ind.

Cutting a Name for Themselves
IN EVERY PHASE OF WAR PRODUCTION

LEWIN-MATHES
ROTATING SHELL BANDS AND SEAMLESS TUBING
of pure copper or gilding metal

Our ever growing facilities enable us to meet your urgent needs.

LEWIN MATHES

LEWIN-MATHES COMPANY · · SAINT LOUIS, MISSOURI

NO, we don't recommend Joe MaGee's toe-hold welding grip—it's not very practical—but he sure is right in what he says! These nine G-E electrodes make it possible to use alternating-current for ***95 per cent of all arc welding jobs.*** That means easier welding, more uniform deposition, and up to 36 per cent ***faster*** welding than is possible with direct-current.

Each electrode in this line gives excellent results with a-c, and each is backed by an impressive service record. The W-26 is particularly outstanding. Developed especially for first-class a-c welding in the vertical and overhead positions, this electrode complies with all the following specifications: A.W.S. Filler Metal Specification E-6011; Navy Bureau of Ships, Specification 46E3, Grade 111, Class 1; American Bureau of Shi ping, Specification H1G and B1G; A.S.M.E. Boil Code, Paragraph U68.

Thousands of users have found that these electrod and G-E alternating current welders are the perfe combination for the fast welding speeds and hig quality welds needed to meet wartime productio schedules. If you are not already using a-c welding will pay you to investigate its many advantages. Simpl contact your G-E arc welding distributor, or write t General Electric, Schenectady, N. Y.

Copyrighted, 1943, General Electric Co.

"Shucks! with all these good A-C ELECTRODES every welding job is easy!"

95 PER CENT of all Arc Welding Work Can Be Done Most Effectively with G-E A-C WELDERS and These NINE Heavily Coated G-E ELECTRODES

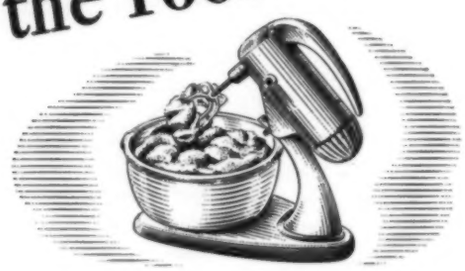
APPLICATION	G-E ELECTRODE	FILLER METAL CLASS (A.W.S.)
Mild steel in any position	W-26	E-6011
	W-20 W-30	E-6012
	W-25	E-6013
Mild steel in the flat position, and horizontal fillets	W-24	E-6020
	W-23	E-6030
High-tensile steel in the flat position, and horizontal fillets	W-54	E-7020
Cast-iron repair	W-83	.....
Wear-resisting surfaces	W-93	.....

ARC WELDING

GENERAL ELECTRIC

672-57-8748

The Mobile Machine Shop Prizes a Part from the Food Mixer



IT MIGHT SEEM strange that a truck equipped to make repairs in the field should find anything of value in a household kitchen mixer. The food mixer is a "lady's man" and so must be trim, light in weight, and stout-hearted. That's why food mixer manufacturers prefer Torrington Needle Bearings—their compact size and ease of lubrication give this modern kitchen equipment much of its "sex appeal."

The mobile machine shop, on the other hand, is *designed* for repair work. Rugged, hard-driven, it is equipped with various kinds of machine tools to do just that. But it was the repair and servicing of planes, tanks and other mechanized equipment "knocked out" in battle that our Armed Forces had in mind when they designed the mobile machine shop. And the Needle Bearing's adaptability to machine tool design looked to Army engineers, as it did to the food mixer people, like just their dish. As it turned out, there were *other* features on the bill of fare of this unusual anti-friction bearing that any repair crew in the field would welcome—the ability to stand up in the severe service a mobile machine shop knows... effective lubrication, low coefficient of friction, increased efficiency of operation...and, of course, the fact that it needs so little attention.

NEEDLE BEARINGS— ALL TYPES—ALL SIZES

NEEDLE BEARINGS TYPE DC are complete, self-contained units consisting of a full complement of rollers and a drawn, hardened outer race. They offer the advantages of small size, low cost, high capacity—and easy installation.

NEEDLE BEARINGS TYPE NCS consist of a full complement of rollers and a relatively heavy hardened outer race. They are furnished with or without inner races. Needle Bearings Type NCS are adaptable to heavier loads than Needle Bearings Type DC.

NEEDLE ROLLERS TYPE LN are produced in a range of types and sizes for assembly on the job into low-cost, high-capacity, anti-friction bearing units. Our engineering department will be glad to advise on the correct size and type for any application.

THE POINT IS YOUR POSTWAR DESIGNS

In considering ways to improve your own product's design for postwar, there's more than one useful idea in the Needle Bearing. For war work has awakened many of *your customers* to the advantages, in performance and cost economy, of compact design, savings in weight, infrequent lubrication and long service life—features which identify the Torrington Needle Bearing. Torrington engineers will be glad to assist you in adapting this new-day bearing to your future designs. Catalog No. 110 listing sizes, ratings and typical applications will prove helpful, also, as preliminary information.

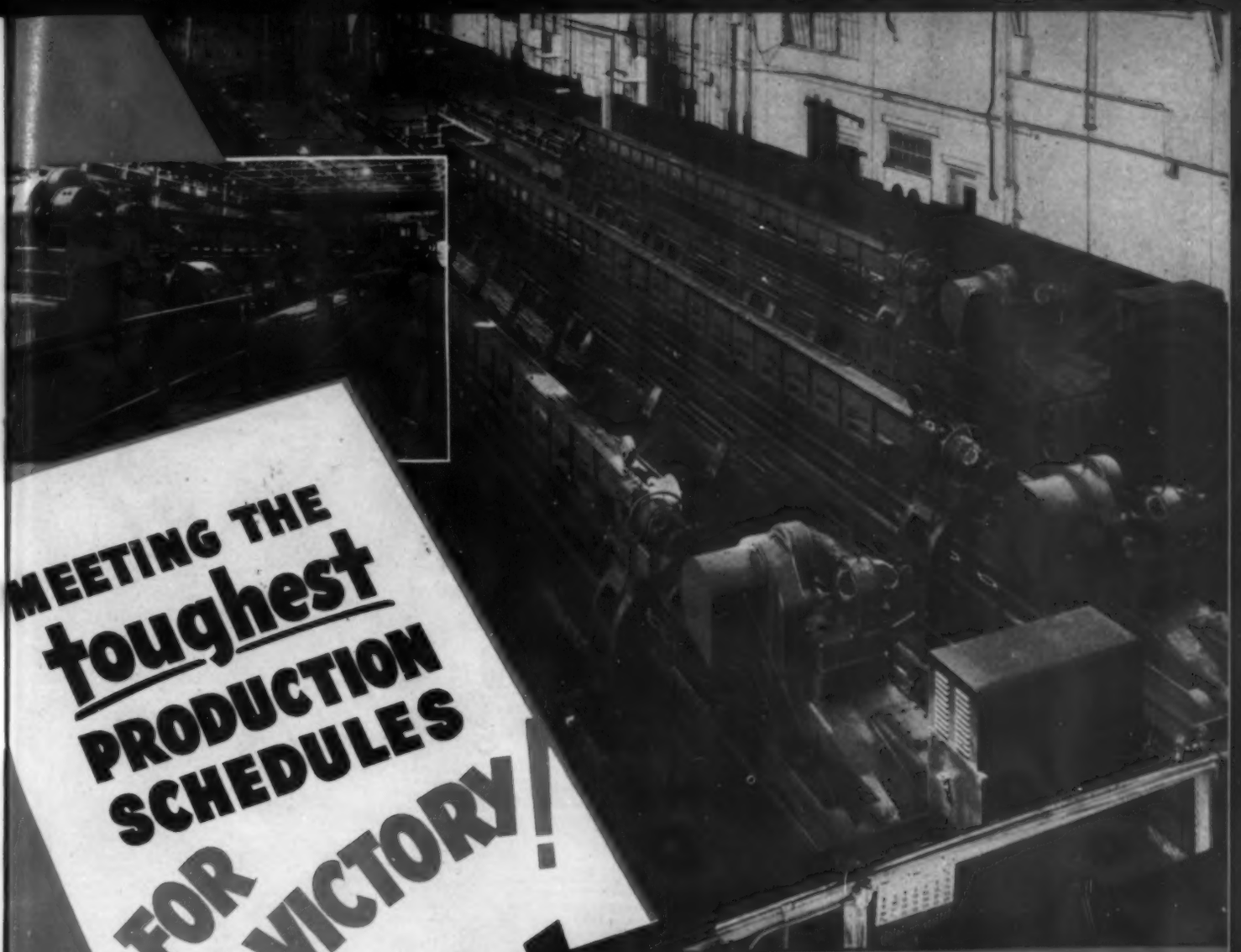
THE TORRINGTON COMPANY

Established 1866 • Torrington, Conn. • South Bend 21, Ind.

Makers of Needle Bearings and Needle Bearing Rollers

New York · Boston · Philadelphia
Detroit · Cleveland · Seattle
San Francisco · Chicago · Los Angeles
Toronto · London, England

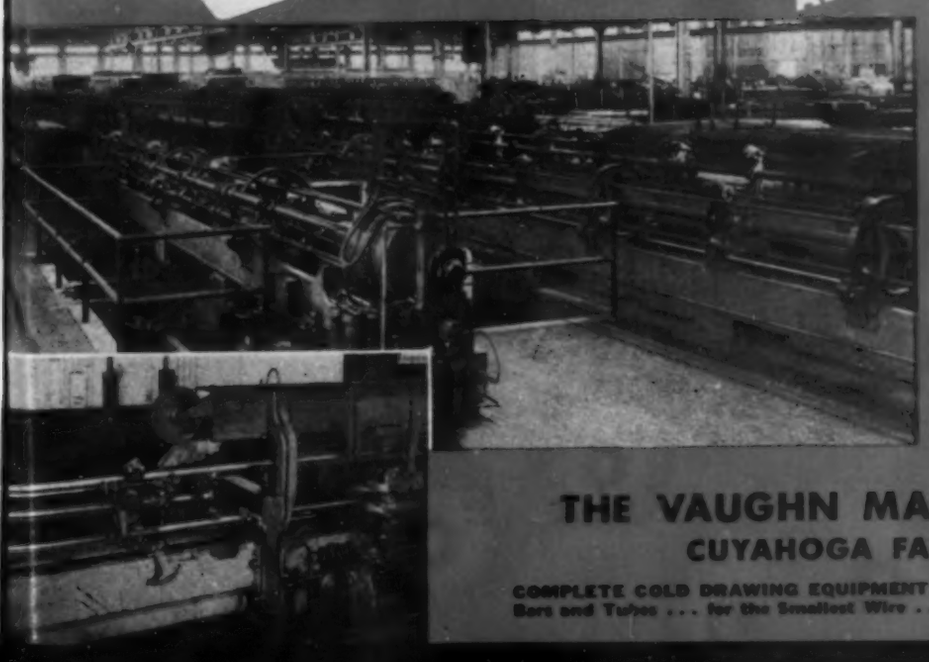
TORRINGTON NEEDLE BEARINGS



MEETING THE **toughest** PRODUCTION SCHEDULES FOR VICTORY!

Vaughn DRAW BENCHES

ALL SIZES FOR BARS & TUBES



In War Plant X (and war plants through the rest of the alphabet), Vaughn Draw Benches measure up to the stiffest production requirements of a nation at war. These views show one 100,000-lb. and two 50,000-lb. Vaughn units drawing special copper-alloy tubing required for condensers and heat exchangers in naval service. In other industrial war assignments, many other Vaughn Draw Benches are proudly showing the stuff they're made of—for now, and the future, too!

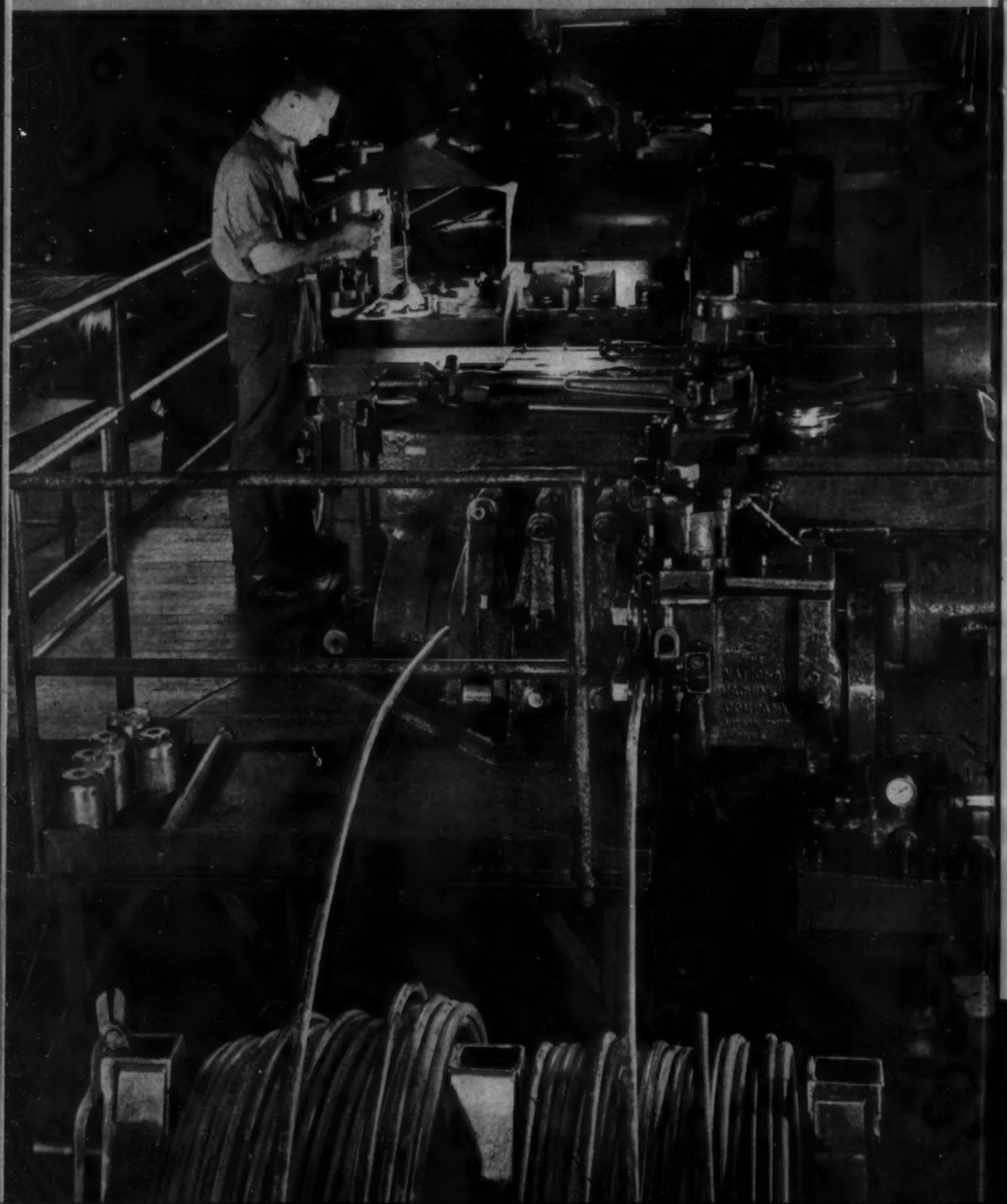
THE VAUGHN MACHINERY COMPANY

CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous Non-Ferrous Materials or their Alloys.

IF *you can make one*

...YOU'VE SPEEDED UP



ne machine do the work of two

UR PRODUCTION OF WAR MATERIAL

● The "specials" shown here have been re-designed to permit manufacturing on bolt machinery. Previously they were made by different methods requiring more material and more operations. Some of these "specials" previously consisted of two or more parts, made separately, *then assembled.*

1. *What was gained by producing these parts by hot or cold forging?*
2. *What advantages do they now have which they previously did not have?*
3. *What benefit to the war production is this method of manufacture?*

We'll answer the above three questions in their respective order, below.

1. Speed in production was one of the first benefits gained by producing these parts by hot or cold forging. Production was increased 500%, 1000% or more. Strength was naturally increased by the forging method, whether needed or not. Materials were saved because the scrap loss by upsetting (hot or cold forging) is so very small.
2. In the case of several of these "special" parts illustrated, actual assembly of two or more parts was needed. This required time and additional labor. *By the upsetting method* assembly was eliminated and the strength of the part increased.
3. Speed—*speed*—and more speed is necessary now with America at war. Forging is essentially a mass production tool of industry. It reproduces innumerable parts, all identical, in large quantities at high speed. Its very method gives these parts greater strength, and if "second operations" are necessary, they can be done usually in pace with the production rate of the forgings themselves.

If you can make ONE machine do the work of TWO—you've speeded up production of war materials! And that's precisely what you want, isn't it? Therefore, before you decide on buying a part that resembles any of those shown here, call in a Lamson engineer to talk it over with you. If the quantity you need is large enough (justifying the cost of the forging dies), and if the time factor in making those dies is less than the time required for tooling up for other methods, you may be able to shift the manufacture of a part from *your* plant to *our own* where the forging machines are already installed, and the "know how" exists in our own organization.

If you can do this without disadvantage, you've released machine tools invaluable for other work that cannot be produced on bolt-making machinery, and you've probably released some skilled shop employees for other jobs without drawing upon the existing available supply of skilled labor.

Consider carefully the possibilities we have brought to your attention. If we can make the part on our bolt machinery, we may help you save hours and days and weeks, possibly months, in deliveries. Isn't this worth fighting for if you are a production man charged with the responsibilities of getting more production out of your present equipment?

These four books will help you in specifying and buying "standard" bolts, nuts and "specials"

THE LAMSON BLUE BOOK—is our complete Catalog of standard products excepting our Aircraft products.

"BOLTS, NUTS & SCREWS"—70 pages of technical and practical information. First copy gratis, requested on your letterhead. Additional copies one dollar each.

"BOLT, NUT & RIVET STANDARDS"—175-page book published by the American Bolt, Nut & Rivet Manufacturers Association, 1550 Hanna Bldg., Cleveland, O. Price one dollar per copy. (Order from publishers, please.)

"SIMPLIFIED STOCK LIST"—of bolts, nuts and screws, conforming to latest revisions of the Office of Price Administration, and of great value in showing you in what ratio quantities of various standard products are kept in stock for deliveries, by your jobbers and in our own (and other bolt manufacturers') warehouse stocks.

THE LAMSON & SESSIONS COMPANY, 1971 W. 85th St., Cleveland, O.

LAMSON & SESSIONS

BOLTS · · NUTS · · COTTERS · · CAP SCREWS · · SPECIALS

Your Jobber Stocks the Lamson Line

WORTHINGTON

QUICK DETACHABLE QD SHEAVES

Installing a 48" PD "C" section 8 groove QD Sheave on a 7" stroke horizontal air compressor. The QD Sheave weighs 440 pounds, four times the girl's weight.

NOW AVAILABLE for DriveN as well as DriveR applications

Women assembling GIANT DRIVEN SHEAVES, no longer are an oddity to be headlined in Ripley's "Believe It Or Not." INEXPERIENCED "GREEN" HELP in assembly plants find these sheaves simple to mount.

The problems of assembling and maintaining Vital DriveN and DriveR machinery have been greatly simplified with the introduction of the Worthington patented QD Sheave with its "Easy To Get On—Easy To Get Off, YET ALWAYS TIGHT ON THE SHAFT" features.

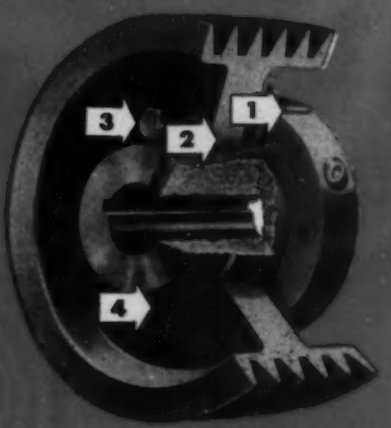
The QD Sheave design has now been incorporated into a complete range of DriveN and DriveR sizes that will accommodate 10,000 drive combinations up to 150 horsepower from stock.

One demonstration will convince you that a wrench and inexperienced hands are all that are needed to install or remove a QD Sheave, regardless of size. Arrange for your demonstration today—write or call the Worthington Multi-V-Drive dealer or the Worthington District Office in your territory.

MEMBER V-BELT ASSOCIATION

MV3-10

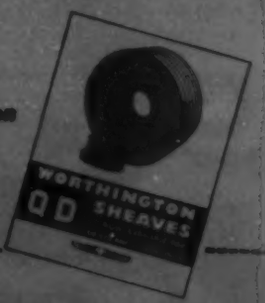
Superior Advantages of the QD Sheave Design Cost No More



WORTHINGTON U.S. PAT. NO. 2,501,021

1. Split Hub for easy mounting or removal from the shaft.
2. Tapered Fit between split hub and rim for easy mounting or removal of rim from hub.
3. Pull-up Bolts which hold the rim onto tapered split hub for tapered friction drive assembly and positive press fit on the shaft.
4. Tapped holes in rim for using pull-up bolts as jack screws to free the tapered friction fit when detaching the rim.

Mail the Coupon NOW for this New Bulletin



I would like more information about the Time, Labor, and Material Saving Advantages of the Worthington QD Sheave.

Name Title

Company

Address

City State County

Product Manufactured

COMPLETE DRIVES — **WORTHINGTON MULTI-V-DRIVES** — SHEAVES OR BELTS ONLY

WORTHINGTON PUMP & MACHINERY CORPORATION • GENERAL OFFICES: HARRISON, N. J.

8 WAYS TO GET BETTER STEEL CASTINGS *Quicker*

1 Anticipate your needs. Give your foundry as much time as possible—they are busy, too. It will help them to know what you need and when you will need it.

2 Whenever possible, avoid special alloys and specifications. Standard specifications are quicker to produce and deliver, especially under war conditions.

3 You'll get better castings—quicker—if you don't expect your foundry to cast parts designed for other methods of production.

4 Consult your foundryman on designs. Often he can make contributions that result in better castings—in less time and at lower cost.

5 Consult your foundryman on patterns—or let him make patterns for you. Proper proportioning of casting members, and proper gates and risers always mean sounder castings.

6 Be sure to give your foundry full and complete specifications, particularly when special testing of castings is required.

7 Specify deliveries that meet your actual production schedules. Don't hoard castings—you may be crippling another plant's production.

8 Look upon your foundryman as a part of your own organization. Work with him—in full cooperation—you are both trying to WIN THE WAR.

Steel Founders' Society of America · Cleveland, Ohio

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

THE FINEST EQUIPMENT IN THE WORLD IS NONE TOO GOOD FOR THE U.S. NAVY!

Our navy today is re-enacting in greater force the glorious traditions written into history by their predecessors. The signals of famous naval officers to their fighting men on going into battle are remembered once more as new exhortations are created for history in this present struggle. For them the finest equipment is none too good because our sea power is vital to Victory.

American industry is doing its part, too, not only in creating new weapons of war, but in breaking all records of production in getting this equipment into action. And after Victory, the mills that are now producing war materials will turn again to the manufacture of peacetime products, using all of the knowledge and advantages of new equipment and processes gained during this struggle.

JESSOP STEELS for MARINE APPLICATIONS

LIGHT ARMOR PLATE

TOOL STEELS

HIGH SPEED STEEL
for Cutting Tools

SHOCK RESISTING STEEL
for Punches, Chisels, Rivet Sets

NON-MAGNETIC STEEL
for Panel Boards

STAINLESS STEEL
for Valves and Turbine Blades

STAINLESS-CLAD STEEL
for Galley Equipment

ARMY E NAVY

JESSOP STEEL CO. JESSOP WASHINGTON, PA.

Established 1901

JESSOP STEEL COMPANY

HEAD OFFICE AND WORKS

WASHINGTON . . . . PENNA.

Helping America's process industries win the battle of materiel production is their acid handling equipment. It must stay in the production line—and Tellurium Lead is helping keep it in fighting trim.

* * *

Every plant man concerned with the maintenance of such chemical apparatus recognizes *heat* as Equipment Enemy No. 1. Aside from its effect on the physical properties of corrosion-resistant metals, heat accelerates corrosion. Solutions and gases easily controlled at room temperatures become increasingly destructive as the heat indicator rises.

In a number of plants* Tellurium Lead has made it possible for equipment to operate satisfactorily at temperatures which made short work of the lining and piping materials previously employed. For this reason it is generally recognized as the "high temperature lead."

Evidence of Tellurium Lead's ability to withstand corrosion at the higher heat levels is given by the results of the flash test reported at right.

Undoubtedly one factor contributing to its corrosion resistance at elevated temperatures is Tellurium Lead's stability of grain structure under prolonged heat exposure—see accompanying photomicrographs. * * *

Tellurium Lead has also been found to perform well under conditions where repeated and abrupt temperature changes, with resulting expanding and contracting forces, subject equipment to recurring stresses. This is thought to be due, among other things, to Tellurium Lead's *work-hardening* characteristic. As this lead is worked, it is toughened—increased in tensile strength.

The work-hardening property of Tellurium Lead is also a safeguard wherever lead must be bent, stretched or hammered, as in elbows, flanges, coils, joints and turnover points.

* * *

Another frequent requirement of acid handling equipment is resistance to vibration. The resultant fatigue stresses, acting in combination with corrosion, are more disastrous than either factor alone. To meet this condition Tellurium Lead not only has the acid corrosion resistance for which lead is noted but also, under vibration tests, it exhibits a 60% greater endurance limit than lead without the tellurium addition.

* * *

Tellurium Lead of our manufacture is time-tested St. Joe chemical lead alloyed with a small quantity of tellurium. It is available in sheet or pipe form, or fabricated in coils for heating and cooling purposes.

For further information address the nearest Company branch listed below.

*TYPICAL CASE HISTORIES

One user of Tellurium Lead reported that eight months after installation, "the lining in our rub showed little if any corrosion due to the action of the 10 per cent boiling sulphuric acid to which it is exposed."

* * *

Another user — whose equipment is subjected to temperatures ranging up to 356° F. — says, "we find Tellurium Lead withstands chemical action to a much greater extent than the material used previously."

* * *

Another company tried a Tellurium Lead heating coil in a plating tank where the average coil life was ten weeks. The Tellurium Lead coil more than doubled this average — stood up for six months.

* * *

Still another company is using Tellurium Lead to line tanks handling phenolic compounds and sulphuric acid at temperatures ranging up to 376° F. Previous lining materials pitted badly after short service. Several of the Tellurium Lead linings have been in three years and have not yet required repair.

Flash Test: Strips of Tellurium Lead (top) and lead without tellurium (bottom) after immersion in 96% sulphuric acid at 581° F. for 3 minutes. Tellurium Lead weight loss, 0.97%—other lead, 5.11%.

Stability of Grain Structure: Grain structure of Tellurium Lead (top) and lead without tellurium (bottom) after annealing six months at 302° F. The grains of the lead without tellurium "grew" during the annealing; those of Tellurium Lead remained the same size.

TELLURIUM LEAD

NATIONAL LEAD COMPANY—New York, Baltimore, Buffalo, Chicago, Cleveland, Cincinnati, St. Louis, National-Boston Lead Co., Boston; John T. Lewis & Bros. Co., Philadelphia; National Lead & Oil Co. of Penna., Pittsburgh; Georgia Lead Works, Atlanta; American Lead Corp., Indianapolis; Master Metals, Inc., Cleveland; The Canada Metal Co., Ltd., Toronto, Montreal, Winnipeg, Vancouver.

a Winning Team!

YOUR riveters will score a new high in production speed if they use these three Cleco products.

CLECO SHEETHOLDERS afford the best method of holding metal sheets together while riveting. They are 80% faster than holding screws, and exert 50 lbs. of *even* clamping pressure. The Exclusive Cleco Repair and Exchange Service permits quick replacement of damaged sheetholders.

CLECO SMALL RIVETERS include both "slow" and "fast" hitters, in many sizes and handle styles—the *right* riveter for *every* job. They strike accurately controlled blows, at the proper speed and power, causing the rivet metal to flow uniformly without structural deterioration. A complete line of Squeeze Riveters also available.

CLECO RIV-N-JECTORS consist of a magazine holding about 50 rivets that can be released one at a time into the rivet hole. Actual tests prove Riv-N-Jectors save 90% of the rivets lost when handled by hand. They enable operators to insert and drive 30 rivets per minute.

These Cleco Tools insure fast, efficient riveting with minimum waste. Write for Bulletins 87, 85 and 89.

THE CLEVELAND PNEUMATIC TOOL COMPANY
3781 East 77th Street **Cleveland, Ohio**
BRANCH OFFICES IN ALL PRINCIPAL CITIES

BUY U. S. WAR BONDS AND STAMPS

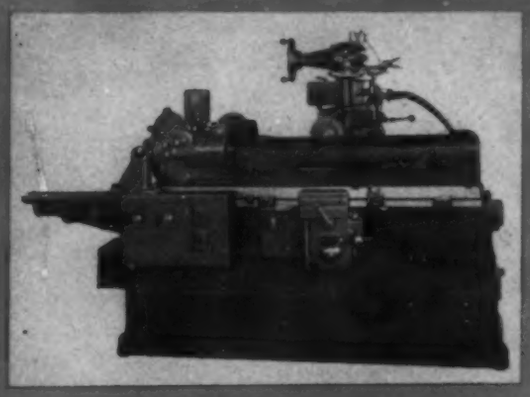
A popular model riveter with the BW handle.

Inserting Cleco sheetholders with our latest design pliers.

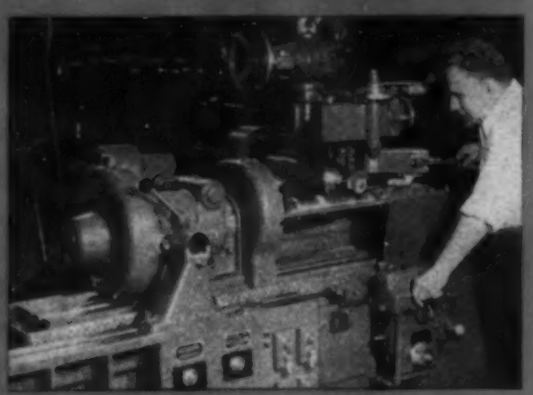
Inserting a rivet with the Riv-N-Jector.

Get all 3 - DIMENSIONAL ACCURACY PERFECTION OF FINISH PRODUCTION SPEED

with FITCHBURG *Automatic Closed Cycle Grinding . .*



FITCHBURG SPLINE GRINDER



GRINDING SPLINES ON WRIGHT AIRPLANE CRANKSHAFTS

EXAMPLES OF WORK GROUND ON FITCHBURG SPLINE GRINDER

The Fitchburg formed wheel grinding method, with automatic closed cycle, produces a wide variety of splines for automotive, airplane and marine industry with fine finish, accuracy and high speed. This results in smoother product performance.

Here are some of the outstanding features of the Fitchburg Spline Grinder:—

These machines are designed so that new operators can be trained quickly to operate them — an important factor in these times.

Wheelhead column may be arranged to swivel to a maximum of 20 degrees for either right-hand or left-hand helical lead angle when helical attachments are furnished.

Elevating mechanism is mounted on top of the column for the convenience of the operator.

The headstock may be furnished for either straight, right-hand, or left-hand helical splines.

The index plate is mounted at the left-hand end of the headstock so that it may be removed easily for changing plates. There is a standard 16 key plate which will take care of 2, 3, 4, 6, 8 and 12 spline shafts by inserts in the index notches. Separate index plates are necessary for other spline divisions.

Many leading industrial plants in the United States are using Fitchburg grinding equipment to speed production and save man hours. Let Fitchburg engineers show you how to speed production by this modern grinding method.

Write today for this catalog showing wide range of successful operations.

FITCHBURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U. S. A.

Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Bath Full Universal Grinders and Special Purpose Grinders.

Special
HIGH SPEED STEEL
CUTTING TOOLS
U.S. TOOL
MFG. CO.
A mature all inclusive organization devoted to the designing and manufacture of special form, milling and all types of metal working tools . . . Right here in the home of high speed precision production, we have kept pace, and anticipated many of the requirements of this kind of tooling . . . Send for new sixty page catalog.
6906 KINGSLEY – DEARBORN, MICHIGAN
Established in nineteen hundred and thirty

MAGNESIUM—
THE KEY TO AIR POWER

American aircraft builders have, in an incredibly short time, created overwhelming air power through advanced design, flo-line production and the use of modern materials, among which magnesium is paramount.

The lowest of structural metals in specific gravity, yet possessing the highest strength-to-weight ratio, magnesium is truly the key to air power.

At the Howard foundry, an ever-increasing tonnage of magnesium castings is being produced for America's planes and other armaments.

The remarkable properties of magnesium, including its easy machinability, which are proving their worth in war, will be equally valuable in many peace-time products, a trend in which Howard Foundry Company's output will figure prominently.

At the other two Howard foundries, aluminum and bronze castings are being poured into fighting equipment of many kinds. Combined, these three foundries provide the largest nonferrous jobbing castings production in America.

When you need nonferrous castings, call on Howard. *For armament today—for utility tomorrow.*

HOWARD FOUNDRY CO.
4900 Bloomingdale Road, Chicago

ARMY E NAVY

HOWARD

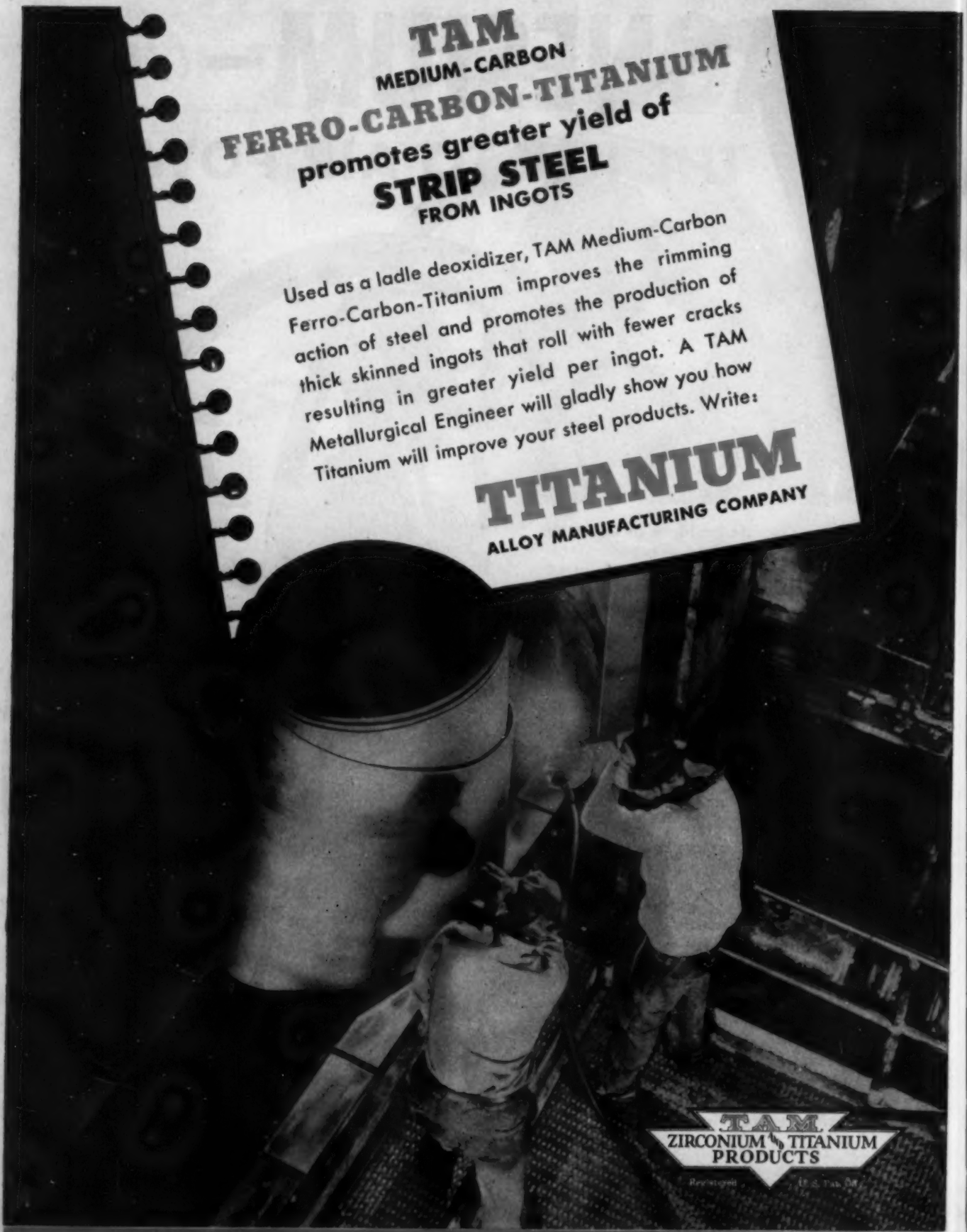
ALUMINUM · BRASS · BRONZE · MAGNESIUM

CASTINGS

TAM
MEDIUM-CARBON
FERRO-CARBON-TITANIUM
promotes greater yield of
STRIP STEEL
FROM INGOTS

Used as a ladle deoxidizer, TAM Medium-Carbon Ferro-Carbon-Titanium improves the rimming action of steel and promotes the production of thick skinned ingots that roll with fewer cracks resulting in greater yield per ingot. A TAM Metallurgical Engineer will gladly show you how Titanium will improve your steel products. Write:

TITANIUM
ALLOY MANUFACTURING COMPANY



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EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

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Simplified Assembly

Ease of Operation

SELLERS NO. 1-G
DRILL GRINDER

SIMPLICITY ITSELF!

1. INSERT DRILL

2. A QUARTER-TURN OF THE RIGHT HAND CHUCKS IT SECURELY

3. MOVE TO GRINDER POSITION

4. GRIND THE SCIENTIFICALLY CORRECT SELLERS POINT

★ **The employment of girls to release manpower for our growing Armed Forces is a new experience for the 94-year-old firm of Wm. Sellers & Co. Only the vital need of the hour could have brought about such a radical change. Yet one of the things that contributed was the very simplicity of Sellers design. That which has been responsible for the precision and ease of operation of Sellers Drill Grinders is making it possible for these young women to assemble these machines with the same accuracy and reliability as the men they have patriotically released for War Service. This same simplicity, combined with precision and ease of operation, is making drill-grinding by girls and other relatively unskilled operators a speedy, accurate job in thousands of factories everywhere.**

WILLIAM SELLERS & CO., INC., Philadelphia, Pa.

Sellers

Automatic Feed Riveting

for AIRCRAFT PRODUCTION!

Designed to handle exclusively aircraft (aluminum alloy riveting) production... this new Air Powered RIVITOR averages 1600 riveted joints per hour... with no manual rivet handling. Combines Air Squeeze action with automatic feeding and setting. Soundly engineered... ruggedly built ...meets today's needs for *speed, accuracy* and *cost-cutting efficiency!* Write for new catalog RP-1.

FOR TOUGH JOBS... SPECIFY T-J

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

Better Performance

in HYDRAULIC POWER MOVEMENT!

Get *maximum* power output and efficiency in hydraulic cylinders... by specifying T-J! Easily and quickly installed. T-J Hydraulic Cylinders avoid excessive pressure losses due to friction ...their advanced design assures that initial high mechanical efficiency is continuously maintained. Available in types and sizes to exert power movement from 1000 to 50,000 lbs. (direct). Write for Bulletin H-40. The Tomkins-Johnson Co., Jackson, Michigan.

Zirconium Improves

MILD-ALLOY HIGH-TENSILE STEELS

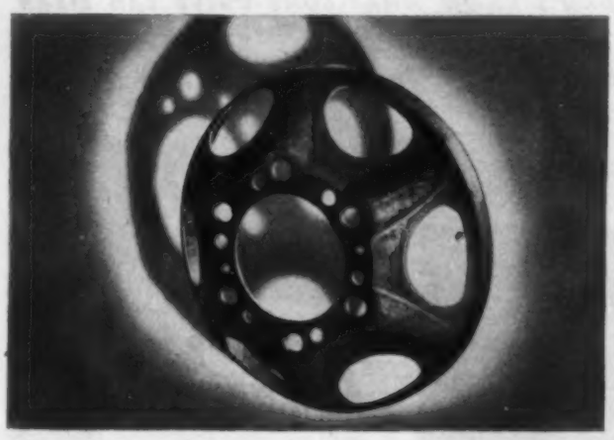
The use of Zirconium in high-strength mild-alloy steels helps to produce a fine-grained steel having high resistance to impact, superior ductility, and excellent cold-forming properties.

Zirconium, by combining with the oxygen and nitrogen of the steel, reduces age-hardening.

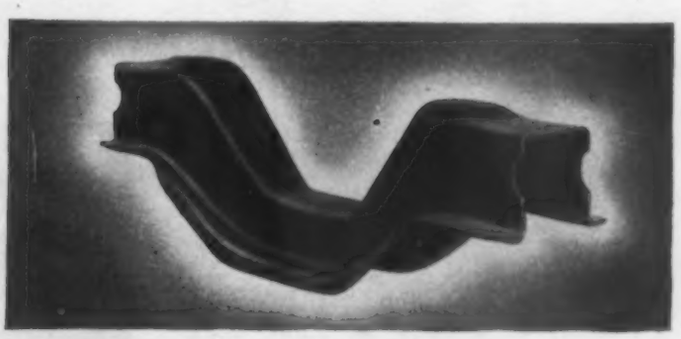
Makers of Zirconium-treated steels claim that these versatile, mild-alloy, high-tensile steels have good weldability and machinability, and have excellent ductility at low temperatures.

If you would like further information on the use of Zirconium and the other Electromet ferro-alloys, call on us. Our staff of trained metallurgists has a store of practical knowledge on the efficient use of ferro-alloys in modern steelmaking practice. There is no obligation for this service.

This picture shows the intermediate and last stages in the forming of a case six inches high from a steel containing Zirconium. The eight deep-drawing operations were done without intermediate annealing.



The excellent ductility of certain Zirconium-bearing steels is illustrated in this wheel which was stamped and formed cold.



This section of a frame was cold-formed in one operation from a mild-alloy, high-tensile steel containing Zirconium.

BUY UNITED STATES WAR BONDS AND STAMPS

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

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Ferro-Alloys & Metals

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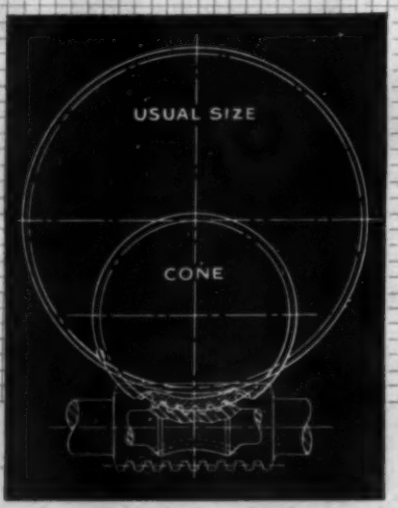
IF YOU DON'T KNOW WHAT CONE-DRIVE CAN MEAN TO YOU ASK FOR MANUALS CW-41-B (FOR EXECUTIVES), CW-41 (FOR DESIGN ENGINEERS.)



1/3 the weight

2/3 the size of conventional gearing

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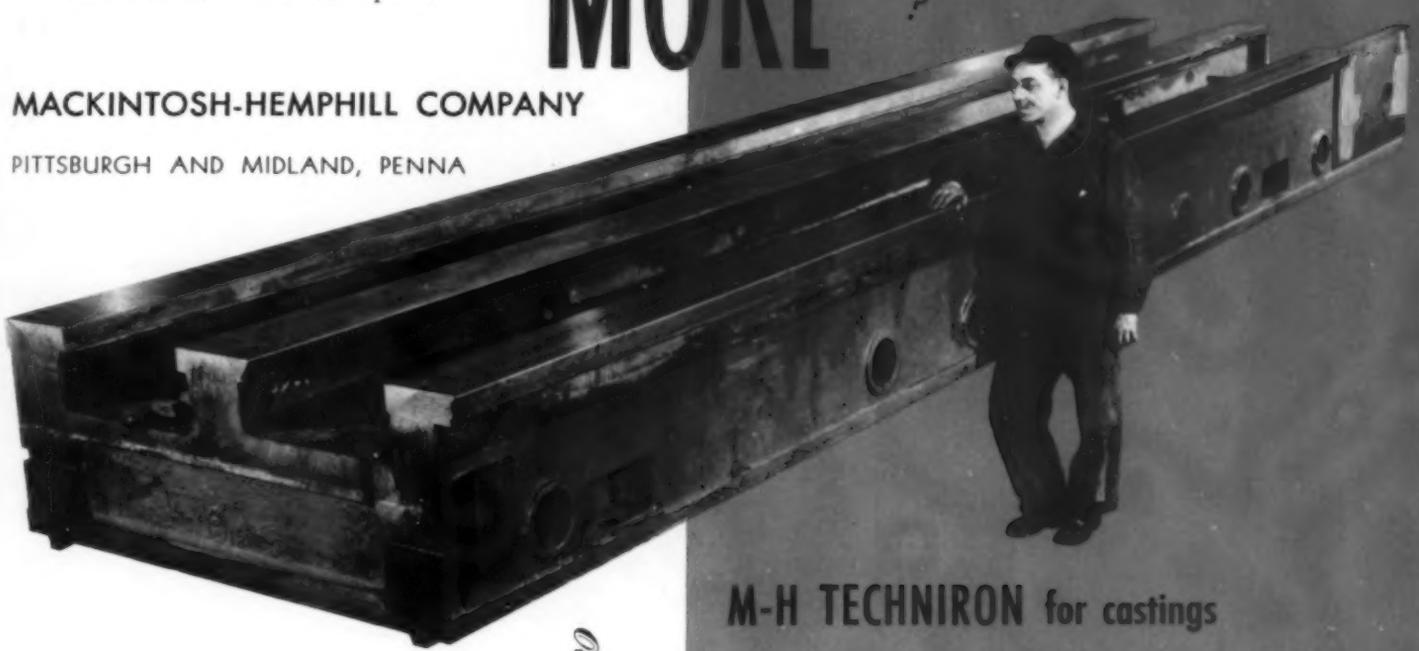

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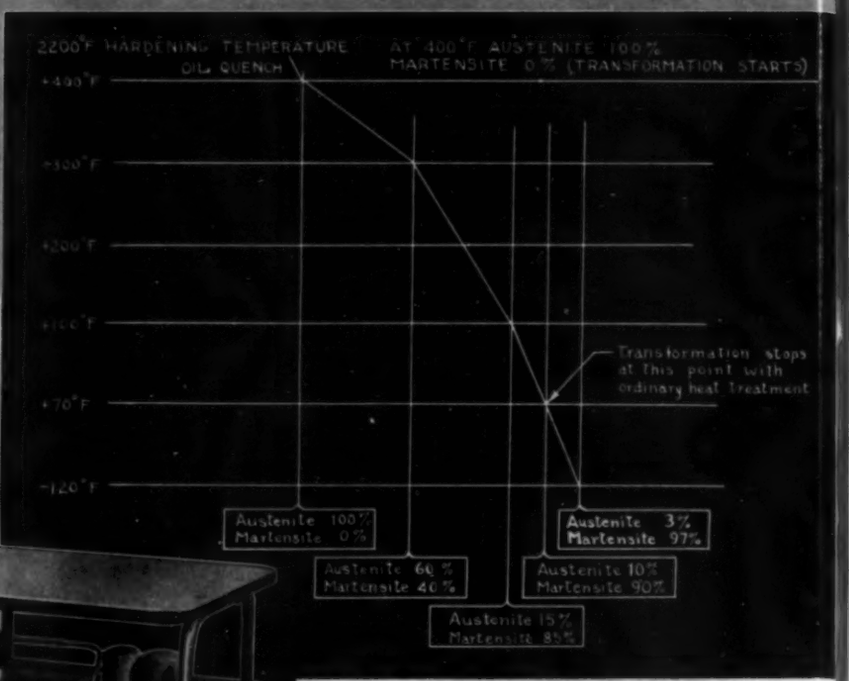
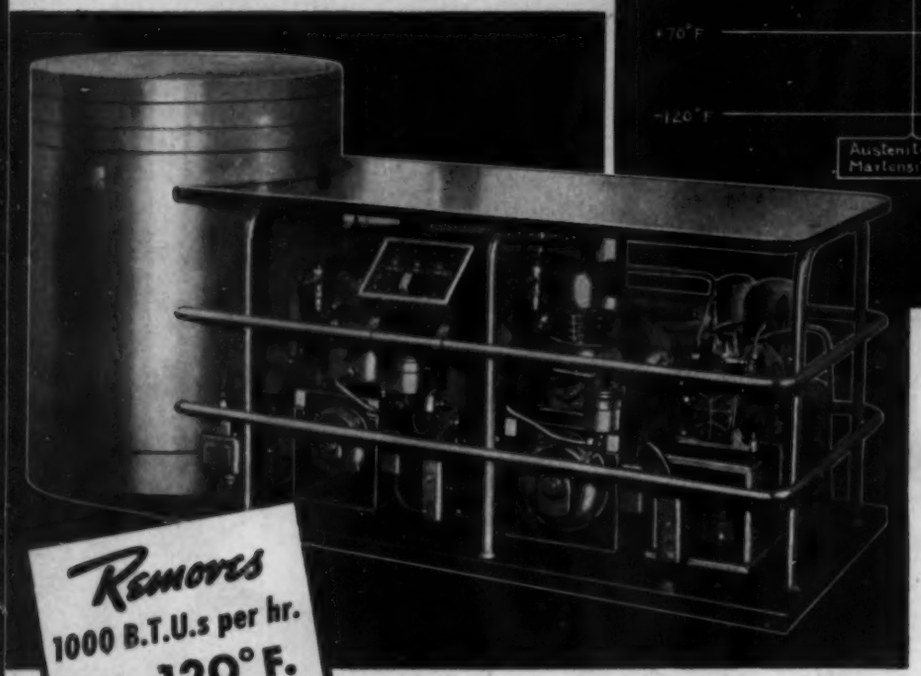
How Cold Treatment of Steel at -120°F. Results in Transformation of Austenite to Martensite

Provides Extra Hardness and Toughness...Relieves Stresses and Strains...Produces Uniformity of Hardness





Removes 1000 B.T.U.s per hr. at -120° F.

The above chart was developed by a prominent metallurgist showing the curve of transformation of Austenite to Martensite in metal at temperatures varying from 400° F. to −120° F.

● The Deepfreeze Cascade −120° F. Industrial Chilling Machine is finding widespread application in the hardening and stabilization of metals by cold treating at temperatures of −100° F. to −120° F. It has been found that the proper cold treatment will produce a uniformity of hardness that clearly indicates that most stresses and strains have been relieved.

The treatment of metals by the chilling method is as yet too new to understand its full possibilities, but recent tests reveal that chilling of steel at −120° F. in a Deepfreeze immediately after quenching results in a greater transformation of the retained Austenite to Martensite. With ordinary heat treatment the transformation stops when the steel reaches room temperature, leaving approximately 10% Austenite content. However, chilling to −120° F. in a Deepfreeze results in a nearly complete decomposition of the retained Austenite.

Deepfreeze Cascade -120° F. Industrial Chilling Machine for the Shrinking, Testing and Treating of Metals . . .

In addition to the treatment of metals, Deepfreeze Chilling Machines are finding many other money saving applications in a wide variety of industrial fields. The Cascade −120° F. Industrial Chilling Machine shown above has the chilling capacity for high production metal chilling of any part where large quantities of heat must be removed fast. It is adaptable to almost any metal chilling job. Let Deepfreeze engineers assist you in the application of cold treatment to your products.

Example Procedures in the Treatment of Steel by Deepfreeze Chilling Method

REX M.M. HIGH SPEED TOOL STEEL

Heat Treatment (Ordinarily Used)	Heat Treatment (Deepfreeze Method)
Pre-heat.....1550° F.	Pre-heat.....1550° F.
Hi-heat.....2160° F.	Hi-heat.....2160° F.
Quench.....(air)	Quench (air) to +120° F.
Draw.....1025° F. (2 hours)	Deepfreeze to −120° F. (3 hours) Warm to atmosphere in air
Cool to room temperature	Draw.....1025° F. (2 hours)
Draw.....1025° F. (2 hours)	Cool to.....+120° F.
Rockwell Showed 63-64 C.	Deepfreeze to −120° F. (3 hours) Warm to atmosphere in air
	Draw.....1025° F. (2 hours)
	Cool to.....+120° F.
	Deepfreeze to −120° F. (3 hours)
	Rockwell Showed 65-67 C.

NOTE: If the Draw is permitted to go over 1025° F. it will be necessary to repeat the Deepfreeze chilling process.

WATER HARDENED DIE STEEL—The following method is that found best adapted for cold treating water hardened die steel.

1—Heat to 1500° F. (or usual method).
2—Quench at 75° F. (or usual method).
3—Immerse at once into Deepfreeze at −120° F.
4—Draw as usual (if drawing temperature exceeds 875° F. then again immerse in Deepfreeze at −120° F.)

FINISHED PRODUCTS—For the cold treatment of finished products not manufactured by the user, the following procedure is successfully used by many firms with Deepfreeze equipment.

1—Heat to 300° F. in tempering furnace (if furnace is not available use boiling water at 212° F.)
2—Cool to atmosphere.
3—Immerse in Deepfreeze at −120° F.
4—Warm to atmosphere.
5—Repeat cycle 5 to 6 times.

Free Additional Information

For additional information on Deepfreeze equipment send for free copy of bulletin with complete details, specifications, and listing other uses.

Deepfreeze

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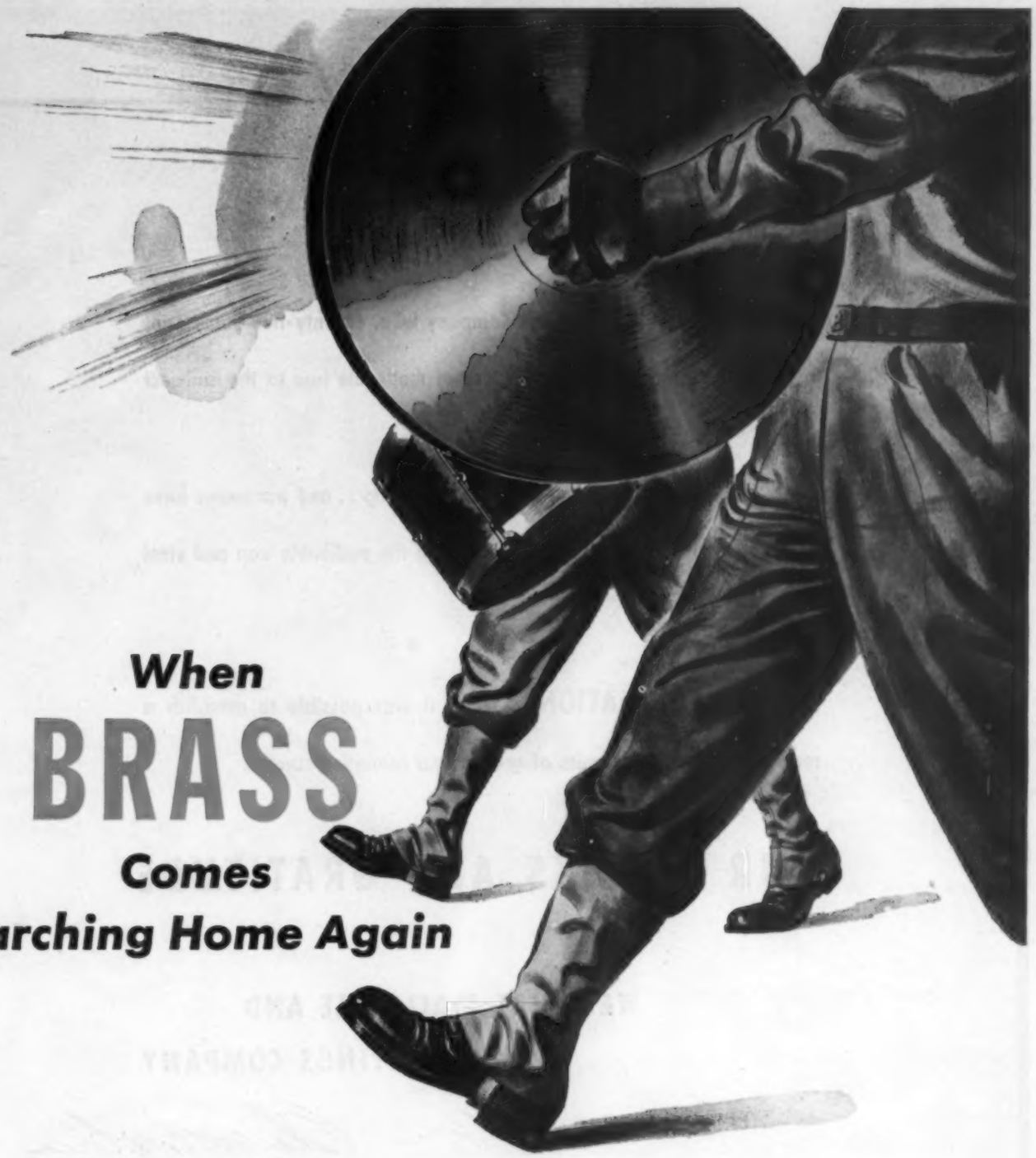
NORTH CHICAGO, ILLINOIS

Industrial Chilling Equipment for Shrinking, Testing, Hardening and Stabilizing Metals

Division of Motor Products Corporation, Detroit, Michigan



When BRASS Comes Marching Home Again

WHEN THE CRASH of gunfire ends with the clash of cymbals in the Victory Parade, brass from Bristol will return from its fifth war to the pursuits and products of peace. Mustered out of service in cartridges, shells, torpedoes and bombs, brass will be available again for all the applications in which its unique qualities of workability, resilience, and durability preclude any possibility of permanent substitution.

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TO ALL OTHERS whose efforts . . friendship . . and patronage have contributed to our Company's leadership in the malleable iron and steel castings industry

★ ★ ★

AND TO THE NATION in which it was possible to establish a record of seventy-five years of growth and continued success,

OUR THANKS AND GRATITUDE

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

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SEYMOUR

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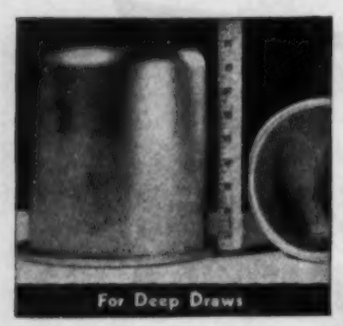
NICKEL SILVER


For Deep Draws

Seymour Nickel Silver is an alloy of copper, nickel and zinc. Silvery white all through, it is the perfect base for silver, nickel and chromium plating. A fine, even grain makes it ideal for ornamental etched articles such as tags, novelties, etc.

It takes any hardness from dead soft up gradually to spring temper. It is especially suitable for extra deep draws and difficult spinning. When leaded for free cutting, it is widely used for non-corrodible screw machine products.

A Silvery White Plating Base

For Non-Corrosive Turnings

Seymour Nickel Silver is made in sheet, wire and rod. The rod comes in round, square, angular and fancy shapes—also leaded for free milling, turning, threading, etc. In numerous standard grades, and in special grades to order.

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Seymour Phosphor Bronze is an alloy of copper, tin and phosphorus. It is highly resilient to corrosion, abrasion, friction and fatigue. Practically indifferent to thermal change, it is dependable material for small bearings.

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For Long-life Switch Contacts

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Seymour Phosphor Bronze Welding Rods, available in Grades A, C and D, for both gas and electric welding, are the product of a long experience in alloying bronzes. Clean, easy melting, they produce welds of high tensile strength.

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99% + Cast Oxide Depolarized—Almost entirely pure nickel. Suitable for most cold nickel baths, but especially those having a high pH. Corrodes evenly under most ordinary shop conditions.

99% + Cast Carbon—A pure nickel anode with carbon content adjusted for smooth, uniform corrosion without special controls. Available, however, with carbon content to meet any specifications. Adaptable for general shop work requiring cold baths.

95-97% Sand Cast—Corrodes readily in solutions low in nickel or weak in salts—therefore suitable for cold, high pH low current density plating solutions. Uniform corrosion throughout the life of this anode is obtained by an even distribution of the carbon content. A 90-92 Sand Cast Seymour Nickel Anode is also available.

"Seycast"—An improved type of 99% + cast anode of very high efficiency designed primarily for Bright Nickel baths, but works perfectly in any hot Watts bath having a pH of 4.5 electrometric or lower. Corrodes evenly with practically no loose nickel formation, due to long, interlocking grains radiating from a common center. Especially suitable for high current densities.

Bright Nickel—A hot organic type process free from promoter metal, stable and easily controlled. Produces brilliant deposits from a standard hot nickel bath without the usual coloring or buffing. Excellent throwing power. Wide operating conditions. Free from wetting out agents.

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ARMY E NAVY

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With production targets being raised constantly to provide ample equipment and materials for our various fighting fronts every machine tool must produce at full capacity—24 hours a day—7 days a week to maintain vital production.

The Fosdick Radial shown is typical of the hundreds of these machines at work in plants throughout the nation.

Here the machine is drilling and counterboring 4 holes 2.834 inch diameter—maintaining limits of .0002 inch. Other operations include drilling and reaming one 5/8" hole, drilling 6—2 9/64" holes, boring 6—41/64" holes, drill and ream 2—.498" holes, drill and tap 1—3/8" hole.

Thus this versatile, easy to operate machine is meeting constantly increased demands for production and accuracy on a wide range of operations for our "all out" war effort.

Investigate a Fosdick for your drilling, reaming, boring and similar operations. Complete information in Radial Bulletin R.S. Write for one.

FOSDICK MACHINE TOOL COMPANY
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WITH *Copperspun* ROTOR

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● It is a 40°C motor—with a ventilating system you will want to know about! ● It is a protected-type motor! ● It has the most adaptable, convenient, and handiest conduit box you ever laid your eyes on! ● It has the famous Fairbanks-Morse COPPERSPUN Rotor!

A demonstration is necessary to fully appreciate the many unique features of this motor. You will want to know all about this new Fairbanks-Morse Motor—especially if you are now buying motors for a war task but want them to be up to the minute when the time comes for post-war production.

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Motors

Boypower has helped solve the problem of labor shortage for many war subcontractors. Page 71

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STEEL

The Magazine of Metalworking and Metalproducing

SEPTEMBER 6, 1943

Volume 113 *Number 10*

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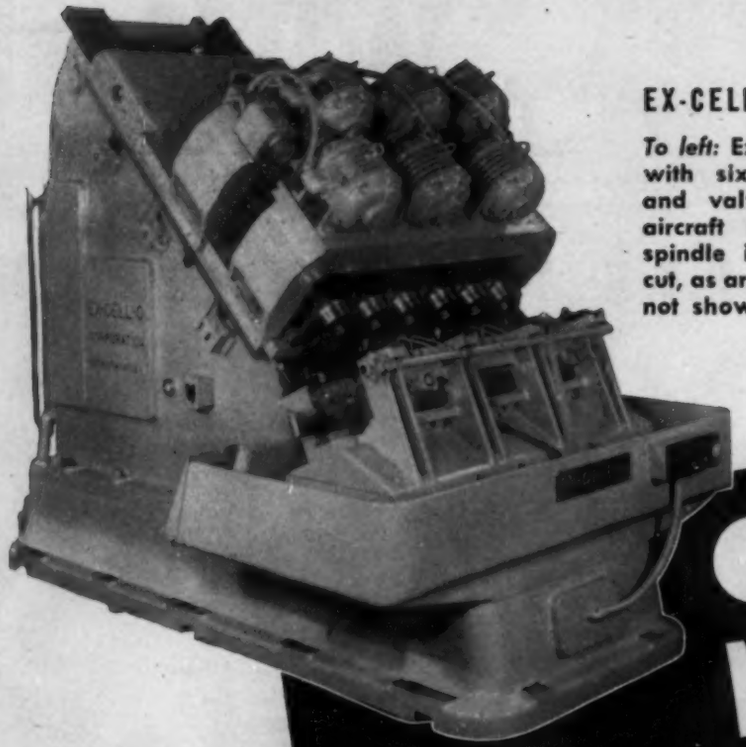

EX-CELL-O CYLINDER BORING MACHINE

To left: **Ex-Cell-O angular type machine equipped with six spindles to finish bore valve seats and valve guide holes in cylinder head of aircraft engine on a production basis. Each spindle is individually adjustable for depth of cut, as are the tools in the boring bars (boring bars, not shown in picture, are piloted in the fixture).**

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. . . for today's production . . . and tomorrow's

For years Ex-Cell-O has been familiarly known as "the headquarters" for special single-purpose machines for turning out accurate parts at a high rate of speed . . . machines that frequently perform numerous operations in one setting of the work and often bring not only a substantial increase in the number of parts produced hourly but also improved quality and reduced unit cost. . . . This is why so many manufacturers have turned to Ex-Cell-O for equipment to meet their war production schedules; why Ex-Cell-O designed machines will figure in the postwar plans of an increasing number of American industries. . . . If you are planning for tomorrow, when the new standards will necessitate costs that are competitive, take advantage of the wide engineering experience and extensive manufacturing facilities that for many years have made Ex-Cell-O a leader in the precision machine tool field.

EX-CELL-O CORPORATION • DETROIT, MICH.

EX-CELL-O SIX-WAY MACHINE

Below: **Ex-Cell-O six-way machine for drilling, broaching and reaming valve guide holes in a magnesium crankcase. This machine is equipped with four standard hydraulic power units and two Ex-Cell-O special hydraulic broaching units.**

XLO

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STEEL
September 6, 1943

Where Manpower Is Wasted

Labor Day and the fourth anniversary of the outbreak of war find the United States in the throes of a difficult manpower situation. It is no overstatement to say that it is the nation's No. 1 internal problem.

The dilemma of the government is easily explained. The military experts have decided that the personnel of the armed services must be increased from 9,300,000 to 11,300,000 by July 1, 1944. If the needed 2,000,000 persons are to be recruited without seriously interfering with vital war production a minimum of 2,600,000 men and women must be shifted from nonessential to essential jobs.

No one doubts that the government could effect this shift by adopting a plan of compulsory job allocation. It could invoke its wartime authority to tell individuals where to work, or Congress could pass the Austin-Wadsworth National War Service Act, introduced last February, which would serve the same purpose.

But the administration, Congress and a large portion of the public shy away from outright regimentation of civilian jobs. They are disposed to try every conceivable expedient of education and persuasion before resorting to the final step of compulsion. The recent attempt to stiffen manpower regulations constitutes the last trial of persuasion and exhortation. If it fails, some form of regimentation will be inevitable.

The present expedient would have a better chance of success if the government itself were setting a good example. John Jones on Main street is not going to be impressed by hints that he shift to a war job as long as he sees the terrific waste of manpower on government payrolls.

Why should he change jobs as long as the government keeps 110 persons on its "Bureau of Geographical Names"? Why should he shift when he knows that tens of thousands of government employes still are working on fantastic social experiments of the Tugwellian era?

At the peak of World War I government civilian employes numbered 917,760. On June 30, 1939—before the present war started—920,310 were on the federal payroll. Now the number exceeds 3,000,000. Among these 3,000,000 are hundreds of thousands whose work is far less essential than that of many privately employed persons in the "nondeferrable" classifications.

Of the 2,600,000 persons in the nation who must be shifted from nonessential to essential work, probably half a million are in the federal service. Stop this waste before getting tough with John Jones.

MORE SCRAP IS NEEDED: WPB and iron and the steel scrap industry are wise in promoting a new nationwide salvage campaign which is scheduled to begin Oct. 1 and continue through Nov. 15. It merits the active support of everybody concerned in any way with the iron and steel scrap supply situation.

Renewed efforts to get out scrap are necessary for several reasons. In the first place, the present supply of scrap plus the amount that could be expected to come in as a result of ordinary efforts may not be enough to see the scrap consuming industries safely through the winter season. The margin of indicated supply over probable needs is too narrow for safety. An easier situation during the present summer months has given us a false sense of security. We must be doubly sure that our supplies will be adequate.

Secondly, scrap collecting has been and will continue to be hampered by handicaps. The manpower problem of dealers is far from satisfactory. Some sources of scrap are drying up. New sources, such

(OVER)

as salvage from the battle zones, may be slow in development.

There is every reason to take this new drive seriously and to support it energetically. —p. 76

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LOCAL AID WILL HELP: Somebody in Washington deserves a pat on the back for suggesting that community leadership be enlisted to help solve the problems of labor shortage.

The idea is practical because labor shortage is not simply a matter of labor supply. It involves housing, transportation, food, medical care, hospital facilities and numerous other factors which can be handled far more effectively through local agencies than by dictation from Washington.

Authorities say that a few months ago acute labor shortages prevailed in only a few areas. Now the situation is rated critical in 55 areas. It is estimated that the number of critical areas will increase from 75 to 100 before the end of the year.

One of the best arguments for decentralizing the administration of manpower problems is that in localities where community leaders have acted to help the situation conditions are noticeably better than in sections where such local assistance has not been given. The idea of community leadership and responsibility is well worth a good trial. —p. 69

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SEEK BALANCED GROWTH: The farther west one goes, the more he is conscious of the activities of local chambers of commerce. On the Pacific Coast most of these bodies are alert to every opportunity to advance the interests of their localities and they do a superlative job of civic promotion.

But it would be a mistake to think that promotion is their chief activity. The Los Angeles chamber, for instance, has won a national reputation for putting southern California's best foot forward for national inspection, yet it probably does more in serious planning for the future than any other chamber of commerce in the country. In short, it is an organization of action as well as of talk or ballyhoo.

One thing which stands out in the civic thinking of the future of metropolitan Los Angeles is that the leaders are seeking economic balance as well as economic expansion. Mere growth without plan can be dangerous. Southern California seems to be conscious of this and is guarding against it.

This attitude will help tremendously in the development of industry in the area. —p. 98

SAVES 30% IN TIME: Although welding played a spectacular part in World War I, its use in production for that conflict was almost negligible compared with its widespread application in war plants today. Almost a quarter of a century of development has made welding an ideal method of fabrication for the present emergency.

Under the pressure for more and more production, some welding engineers have been stressing the advantages of using larger electrodes. When large-diameter welding rods are used, more weld metal is deposited in a given period and there is a marked reduction in the number of electrode changes necessary.

Indicative of the savings effected by using larger rods is the experience of a war contractor engaged in fabricating fuze boxes for housing electrical control equipment for gun-firing mechanisms. By changing to larger electrodes, fabricating time was reduced 30 per cent due to the fact that the welding speed was increased from 12 to 30 inches per minute.

This is typical of the numerous efficiencies in method which have contributed heavily to the effectiveness of the war effort. —p. 104

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BETTER THAN IT LOOKS: Following several months of bear stories about war production, Donald Nelson's report that munitions output in July was up 3 per cent is encouraging.

Perhaps 3 per cent seems unimpressive compared with the gains of 10 or 11 per cent recorded in some months in 1942. But 3 per cent, added to the high rate of output maintained in recent months, can mean a greater increase in actual volume than was the case in earlier months when the advance, measured in percentage points, was higher.

The July report is gratifying for another reason. We are in a period of cutbacks, cancellations, manpower adjustments, arguments over severity of inspection, etc., etc. That the nation's workshop can register a 3 per cent gain in spite of these handicaps is a remarkable achievement. —p. 72

E. L. Shaner

EDITOR-IN-CHIEF

"Share the Steel" Plan Succeeding!

Idle Steel Goes into War Production

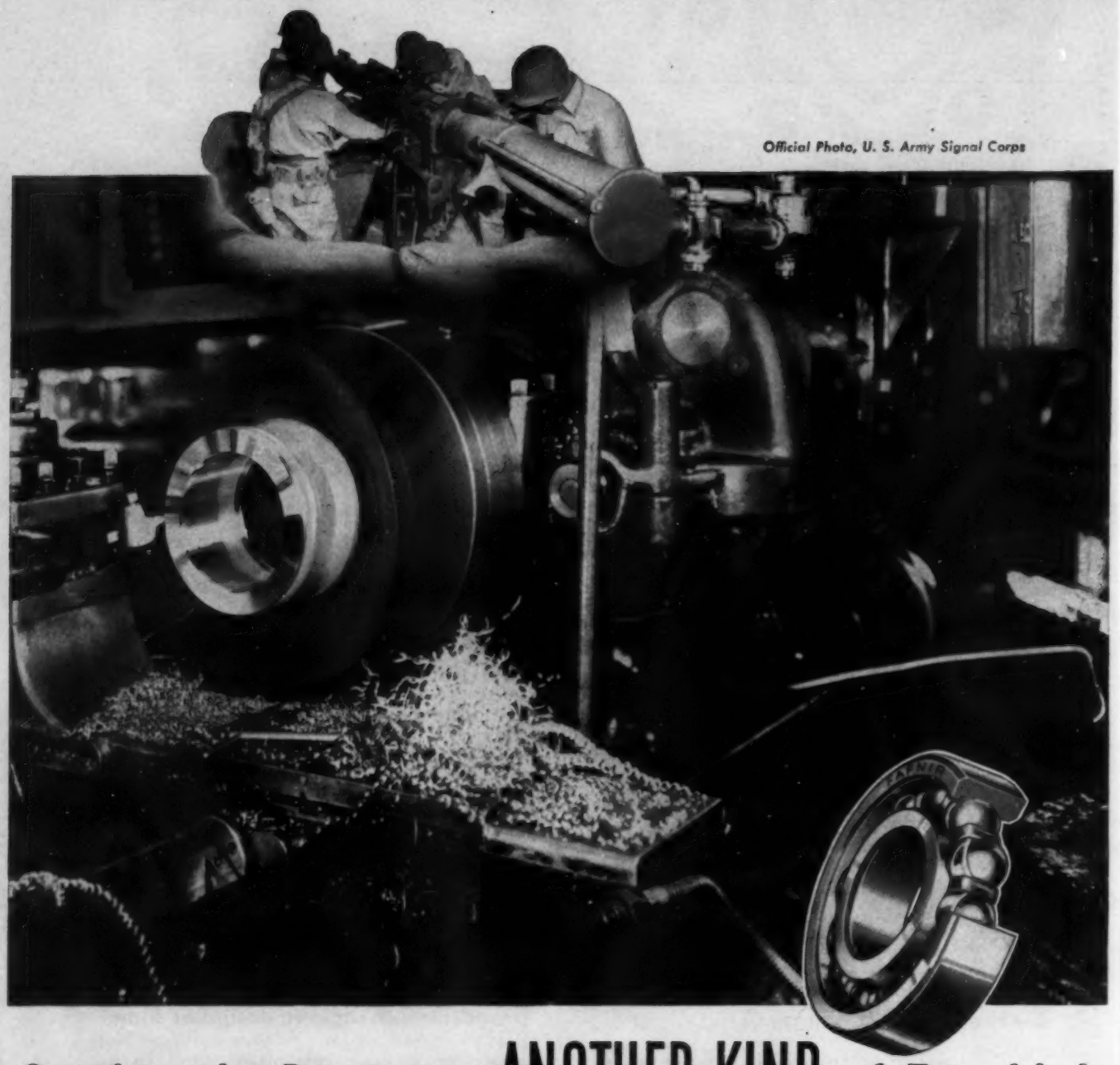
American steel-users, cooperating in the WPB's "Share the Steel" program, already have released approximately a million tons by eliminating idle or duplicate stocks, and through cancellation of mill tonnages on order. Another million tons are in prospect. This will mean the equivalent of adding two million tons of steel production for war use in the third and fourth quarters which is the goal of the War Production Board.

Constantly improving warehouse stocks help to make this program safe and practical because one stock in a manufacturer's inventory serves only one manufacturer, while a similar stock in a centrally located steel warehouse serves thousands of manufacturers. The warehouse stock moves faster and less steel is required.

The need is urgent! Let's keep every ton of steel working. It will not only help the war effort, but it is good business to hold your inventory to a practical working level. Then if increased production, changes in design or some emergency requires more steel in a hurry, you can always depend on your nearby steel-service plant.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. STEEL-SERVICE PLANTS AT: CHICAGO, ST. LOUIS, DETROIT, MILWAUKEE, CINCINNATI, CLEVELAND, BUFFALO, BOSTON, PHILADELPHIA, JERSEY CITY



Official Photo, U. S. Army Signal Corps

Getting the Range on ANOTHER KIND of Trouble!

A slight chatter in a machine tool in a Michigan factory may cause a machine gun to jam in Africa. An important piece of equipment forced out of action in Delaware may mean that a Marine in New Guinea runs out of ammunition. Discouraging the relentless attack of *trouble* is a matter of most serious concern throughout our great war industry, right now.

This need to eliminate troubles, slow-downs and breakdowns in these hard working machines is magnifying the importance of Ball Bearings! Friction-free Fafnir Ball Bearings were made to discourage these casualties. Their rugged stamina and Balanced Design . . . larger balls and deeper races . . keep them on the job on machines whose work-day is 24 hours *every day*. Their in-built precision defeats chatter and deflections on machines that must hold tolerances on the button . . . month after month. The Fafnir Bearing Company, New Britain, Conn.

ARMY (E) NAVY

FAFNIR

BALL BEARINGS

Trailer camps, used in many war production centers to alleviate acute housing shortages, require intelligent community co-operation in their administration. Units in the camp shown above house four people, but are considered only temporary shelter pending construction of more adequate facilities

COMMUNITY ACTION GETS RESULTS

Better and more complete utilization of available labor to be sought through nation-wide program patterned after plan now being successfully operated in the Dayton-Springfield, O., area and at Buffalo

"COMMUNITY leadership" campaign to bring about better and more complete utilization of labor and thus relieve a manpower problem that now rapidly is becoming really critical in many areas is about to be launched on a country-wide scale.

The type of pattern on which community action is to be set up already has been successfully developed and used in the Dayton-Springfield area in Ohio and at Buffalo. Action now is under way to organize similar community groups on the West Coast and in the Connecticut valley, now the most acute labor-shortage areas. Similar groups will be organized elsewhere as rapidly as possible.

Whereas a few months ago there were comparatively few critical labor areas, today they number some 55 and according to present threats will be somewhere between 75 and 100 before the end of the year—unless effective action can be taken in time.

"This whole problem of labor has gotten far beyond the point where it can be solved out of Washington," remarks a top man concerned with this subject. "The only sound solution is to move work and people in such a way as to place first emphasis on war production. That is a problem that can be solved only with full community help and leadership."

One of the community efforts that is regarded as having unusual merit is the one that has accomplished such amazing results in the Dayton-Springfield area. So highly does the War Manpower Commission regard the Dayton-Springfield community group plan that it called upon the Office of War Information to report on it in order to make it easier for other communities to launch similar plans. The following is a summary of the high spots of the OWI report.

Efforts Bring Reclassification

The Dayton-Springfield labor market was reclassified on July 29 by the WMC into group two (areas of labor stringency or in which a labor shortage may be anticipated within six months). Since last winter, it had been in group one (areas of acute labor shortage and, therefore, denied additional war contracts). The change in classification enables Dayton and Springfield war plants to renew their present contracts and, in some cases, to accept new ones. In addition to bringing this satisfactory result, the community campaign relieved much of the stress on services and wartime living conditions. It stopped most of the flow of outsiders into the community where no housing was available to them and made it possible to carry on war production with the persons who were already in Dayton and Springfield.

Dayton relieved its situation through the following steps:

1—The WMC area labor-management committee stopped inmigration. All manufacturers and retailers agreed not to hire any persons who had been in the community less than 30 days, except with the approval of the United States Employment Service. Approval is granted only in cases of key workers of construction crews, there being a local shortage of the latter. As a result, hiring of outsiders has fallen from 500 a week to about 125.

2—Dayton and Springfield manufacturers voluntarily agreed not to seek any contracts that would require them to hire more workers than they had estimated they would need in their O. E. S. (manpower inventory) reports of May 1, except with WMC approval.

3—Retailers, including the large department stores, agreed to reduce full-time employment to 1940 levels.

4—The Wright and Patterson airfields, for purpose of operating efficiency, adopted a policy of decentralizing wherever possible and took definite action toward fuller and better utilization of manpower at the fields.

5—The larger war plants declared a 90-day moratorium on hiring while determining the true manpower situation in the community.

6—Radio stations, posters and newspapers warned outsiders to stay away from Dayton unless they possessed special skills not available in the community.

7—Manufacturers and the airfields were polled to secure revised and realistic estimates of future labor needs. It was determined that manpower estimates for the year ended May 1, 1943, were 11,085 more than actual hirings. The poll resulted in decreasing manpower estimates for the next three months by 9622 and for the next year by 18,394.

8—Since women were the area's biggest source of potential manpower, manufacturers were asked to "reserve" certain occupations exclusively for women. It was found that women could handle 6000 jobs filled by men.

9—Volunteers conducted a Gallup-type poll of the women in the area and found there were more available for wartime jobs than had been estimated pre-

viously. WMC had credited Dayton-Springfield with 9000 potential women workers not already employed. The new poll showed 10,137 women available full time, 7508 part time and 9272 "available maybe."

10—An information campaign is now being conducted through newspapers, press, billboards, radio, motion pictures and special pamphlets to get women to take wartime jobs.

Stores Establish Evening Hours

11—Stores, banks, ration stations, barber shops, beauty parlors and other community services were persuaded to remain open two nights a week for the benefit of war workers. This is the first war center in the nation to take this important step.

12—Many Dayton families have responded to a patriotic appeal and have "opened their homes" to war workers.

13—Five hundred private homes were converted into apartments, several dormitories were erected and housing projects speeded to fill the acute need for family-type housing.

14—Nine buses were added to the line providing service to the airfields, located in isolated sections between Dayton and Springfield. Expansion of the fields created the greatest demand for manpower in the area. However, Dayton, which supplied 90 per cent of the airfield workers, found that the bus lines were so overtaxed that workers often had to wait as long as an hour and a half for room on a bus and spent that time in line at unsheltered loading stations. Sheltered platforms were built and nine large buses added to the line, cutting the waiting time to 15 minutes or less.

15—A special survey was made preparatory to organizing a community-wide recreational program in both Dayton and Springfield.

16—Frills were eliminated from laundry and restaurant services so that more people could be served and waiting time reduced.

The population of Dayton in the past three years has increased from 210,718 to more than 275,000. In the same period Springfield has grown from 70,662 to more than 85,000. Neither city was prepared for this sudden growth and all sorts of bad situations developed. There were shortages of housing, transportation, recreational facilities, physicians, dentists, nurses, hospitals. There was a huge labor turnover when imported workers rebelled at the Dayton living conditions and went back home. Absenteeism was high.

The situation reached a climax in January of this year when it was spontaneously recognized that concerted action would have to be taken to get it

ROBERT C. GOODWIN
Director, Region V, War Manpower Commission

under control. The first step was the appointment of an advisory committee composed of Dr. F. G. Barr, the National Cash Register Co.; Otto L. Spaeth, Dayton Tool & Engineering Co.; O. L. Beardsley, Frigidaire division, General Motors Corp.; A. R. Fors, Airtemp Corp.; R. E. Armstrong and H. C. Jones, American Federation of Labor, and Orville L. Kuhnle and Clyde Mathews, representing the Congress of Industrial Organizations.

This committee drew up the following employment stabilization program:

1—To provide for the orderly transfer of workers to the jobs in which they can best serve the war effort.

2—To prevent labor pirating.

3—To prohibit useless change of jobs by workers; to curtail the labor waste involved in labor turnover.

4—To encourage more friendly and less hasty interaction between management and labor by requiring separation interviews before an employe leaves his job.

Adopts Similar Program

A similar program was adopted by a Springfield committee composed of John H. Horstman, Robbins & Meyers Inc.; Howard W. Gustafson, Oliver Farm Equipment Co.; J. Robert Groff, James Leffel & Co.; William C. Jordan, Steel Products Engineering Co.; Walter Bailey and Stanley Colliver, Congress of Industrial Organizations, and Edward E. Forrer and Glen Detling, American Federation of Labor.

As a result of deliberations by these committees under the leadership of the War Manpower Commission, the following emergency committee—comprising Dayton's socalled "first team"—was organized: S. C. Allyn, president, the National Cash Register Co.; Col. E. A. Deeds, chairman, the National Cash Register Co.; M. A. Spayd, executive vice president, Standard Cash Register Co., and president, Dayton Chamber of Commerce; Paul W. Williams, managing director, Dayton Chamber of Commerce; Maj. Gen. Walter H. Frank, commanding general, Air Service Command, Army Air Forces; Frederick H. Rike, president, Rike-Kumler Co.; Charles F. Kettering, vice president, General Motors Corp.; Mayor Frank M. Krebs, Brig. Gen. Charles E. Branshaw, commanding general, Army Air Forces Materiel Command, Wright Field; Walter H. J. Behm, president, Winters National Bank & Trust Co.; James H. Davis, General Motors Corp.; Marion A. Gregg, WMC's area director; R. E. Armstrong, Charles Bratten Jr. and Harvey C. Jones of the American Federation of Labor, and Jack Fiske, Fred Fudge and Orville Kuhnle of the Congress of Industrial Organizations.

Situation Seemed Hopeless

The emergency committee faced a situation whose solution appeared almost impossible. It held meetings and outlined a course of action. It called meetings of manufacturers and businessmen and asked for needed information. They were asked to agree to the "controlled hiring" plan. They were asked to utilize existing labor more effectively. The committee studied housing and other needs. It obtained priorities enabling construction of a new hospital. It made recommendations to the Office of Defense Transportation which brought an improvement in transportation facilities. It arranged for a child care program to permit more women to work in war plants. It asked the laundries to cut out frills and luxury service and it found more women workers for the laundries.

The plan which provides for an interview between employer and employe before the latter leaves his job for employment elsewhere, is showing specially good results. This policy, along with the better transportation and other services in the community, has cut turnover from 10 to 12 per cent a month to 6.4 per cent on the average.

That a job has been done in the Dayton-Springfield area is attested by this statement by Robert C. Goodwin, regional director, War Manpower Commission, for Ohio, Michigan and Kentucky:

"This is no longer an acute labor shortage area. We had a hard time deciding to remove it from the list. We did so only after being convinced that the whole community, management, labor and the public, was ready to go all the way in its effort to use all available local labor to the fullest possible extent. We believe that employment stabilization will continue to work and that the area will stay out of the shortage list."

Boypower Breaks Bottleneck

Small midwestern machine shop finds solution to labor shortage in youths and white collar workers. . . Becomes efficient subcontractor

HOW a small midwestern machine shop licked the problem of materials and labor shortages to avert disaster to itself and become a unit in the American munitions producing machine is the story of the Portland Machine & Tool Works, Portland, Ind.

It is a story of ingenuity, of community co-operation, and of willing sacrifice to bolster the war effort.

Soon after Pearl Harbor, this plant, in common with many others, found that materials previously used for civilian production were being allocated only to war plants. Skilled labor of these small plants was gravitating toward the larger war industries.

Portland Machine & Tool Works, whose principal business had been the repairing of farm machinery, found itself with inadequate priorities to obtain materials, and only one employe in addition to the two operators. Closing the shop appeared inevitable.

What to do?

The operators, Henry Doctor and Fred Hilgeman, talked with Portland business men and with the Army ordnance officials. The Army men pointed out the possibilities of obtaining war work in the form of subcontracts. Through extension of the prime contractor's priorities, this would solve the materials problem.

First order obtained was for machining 1800 torpedo parts.

Necessary additional machinery was obtained by purchasing discarded tool and die machinery and equipping them with special jigs and fixtures.

But labor was still a problem. Here the citizens of Portland, a town of only a few thousand people, came to the rescue. Boys of high school age were trained to man the machines during the day. At night, local business men, bankers, lawyers and clerks took over. Each worker was trained to do a special type of work.

Now some 30 employees keep the wheels of this small plant—it has only about 3000 square feet of floor space—turning to capacity around the clock, making machined parts for PT boats, submarines, bombs, tanks and Liberty ships.

The "50 per cent manpower and 50 per cent boypower" system worked so well that school authorities are cooperating with all industry in the community to develop a system whereby the boys can be rotated on half shifts during the school year.

General manager of the plant is Gordon Meeker, who during the day handles all the community's legal affairs as city attorney and devotes his evenings to the direction of the company.

What will happen to this and similar plants after the war? Mr. Meeker says:

"The present emergency not only gave small business a chance to help with the war effort, but the contacts made with the larger manufacturers through subcontracts present an opportunity after the war to continue business when these large firms switch to peacetime products. If we do a good job today, we certainly will get our share of business tomorrow."

Foundry Workers Needed in Three Midwest States

Foundries in Indiana, Illinois, and Wisconsin will need 13,000 new workers early in September. This was disclosed last week by Dean William H. Spencer, regional director, War Manpower Commission.

Boypower is the answer to the manpower shortage in Portland, Ind. Here a 16-year-old operates a lathe. The youths are trained in a variety of operations and are keenly interested in their jobs

John Jaqua, a banker, takes his turn on the night shift operating a drill press. Lawyers, clerks and business men work enthusiastically in this small plant to keep parts moving to prime contractors

Arms Output Gains 3% in July

Aircraft, signal equipment and Army ammunition present most difficult production problems of future. Sharp increases in ship construction scheduled but peak is near

MUNITIONS production increased 3 percent in July, moving away from the level of April, May and June, WPB Chairman Donald M. Nelson reported last week.

The munitions output index, covering ships, planes, tanks, ordnance, and miscellaneous items, rose to 593 from a revised figure of 573 for June.

A noteworthy achievement for the month was a 17 per cent increase in signal equipment and a 25 per cent increase in delivery of destroyers and destroyer escorts.

Ground ordnance advanced 6 per cent to meet schedules. July output established a new record.

Aircraft and related munitions also helped to dominate the month's showing, moving 5 per cent ahead of the preceding month.

"In many programs," Mr. Nelson's report said, "production problems have been largely licked and peak production rates have been achieved or are not far off. The most difficult production problems that remain are concentrated in three major programs where important further increases are required: Airplanes, signal equipment and Army ammunition."

Airplane production increased 4 per cent in July over June and was 143 per cent ahead of July, 1942.

Army ammunition showed no increase in July but was 45 per cent ahead of July, 1942

Signal equipment, in addition to gaining 17 per cent in July, was 145 per cent ahead of the same month a year ago.

The 4 per cent increase in aircraft included a 19 per cent increase in fighting planes and an 8 per cent increase for transports. Heavy bombers increased 13 per cent.

Ship construction calls for sharp increases in the immediate future but peak rates are not far off. Naval vessels showed a 7 per cent increase in July over June and an 85 per cent increase over July a year ago. Merchant ships increased 4 per cent in July and 81 per cent over a year ago. These figures take into account work on ships not yet completed.

Other programs, including artillery, antiaircraft guns, small arms, combat and motor vehicles, and miscellaneous and quartermaster items increased moderately.

Mr. Nelson mentioned a number of smaller programs where considerable progress has been made. These include:

The production problem in magnesium and aluminum has been overcome.

Quartz crystal output, important in communication, has been increased markedly.

A new important domestic industry, diamond dies, has been erected.

Substitution programs have been of considerable assistance in remedying the tight situation in jewel bearings.

Another achievement is the development of a generally satisfactory situation in steel.

In the accompanying table of munitions production index, figures for 1942 and 1943 have been revised.

MUNITIONS INDEX
(November 1941 = 100)

Month	1940	1941	1942	1943
Jan.	..	41	166	460
Feb.	..	45	182	486
Mar.	..	52	213	530
Apr.	..	60	247	563
May	..	57	276	564
June	..	59	309	573
July	23	64	339	593
Aug.	22	72	372	...
Sept.	22	83	387	...
Oct.	27	91	403	...
Nov.	34	100	448	...
Dec.	50	133	497	...

Non-CMP Units Consolidate Material Needs on One Form

Applications for priorities assistance (form WPB-2613) to be used by persons not operating under the Controlled Materials Plan, for fourth quarter aid, have been mailed to companies operating under priorities regulation No. 11B. This regulation and form, which is an application for aid in obtaining other than controlled materials, enables manufacturers who do not operate under CMP to consolidate their material requirements on one application.

Following changes have been made in WPB-2613 and in regulation No. 11B: (1) Production schedules now may be authorized as much as one year in advance; (2) if priority assistance is needed to purchase materials that are covered by a WPB order which requires a special application be filed stating quantity, grade, type, and size, such requests may be made on WPB-2613, making it unnecessary to file the application specified in the order; (3) persons using small amounts of controlled materials may no longer make application for such items on form WPB-2613.

Manufacturers using WPB-2613 are requested to have their application in Washington by Sept. 15.

British Production Rises 25 Per Cent

British munitions production in the second quarter of 1943 was 25 per cent higher than the comparable period in 1942, according to Oliver Lyttelton, Minister of Production.

Aircraft output was 44 per cent higher in structural weight than a year ago.

Munitions output for the first half year equalled schedules.

Contract Termination Problem Seen Eased by Broader V Loan Basis

GOVERNMENT guaranteed V loans will be made available to war contractors and subcontractors on a broader basis than heretofore, effective immediately, under a plan jointly announced last week by the War and Navy Departments, the U. S. Maritime Commission and the Federal Reserve Board.

In the past, advances under V loans have been restricted, in general, to working capital needs for war production. The broadening of the plan will enable contractors to obtain use of most of their own working capital immediately upon termination of their contracts.

The contractor or subcontractor will obtain a V loan exactly as at present except that, if the loan is intended to free his own working capital upon termination of contracts as well as to provide him with working capital needed to finance them, then there are to be two changes in the present guarantee agreement, viz:

(1) The bank will be required at all times to have a participation in the loan and, accordingly, the original percentage of guarantee specified in the guarantee agreement will not be increased by reason of contract cancellations, and

(2) The bank must share with the government any commitment fee, which may not exceed ½ of 1 per cent per annum on the undisbursed portion of the

credit, in the same proportion that the guarantee fee now bears to the interest payable on V loan, viz; if the percentage of guarantee is

60 per cent, the government's share is 10 per cent of the commitment fee.
65 per cent, the government's share is 12½ per cent of the commitment fee.
70 per cent, the government's share is 15 per cent of the commitment fee.
75 per cent, the government's share is 17½ per cent of the commitment fee.
80 per cent, the government's share is 20 per cent of the commitment fee.
85 per cent, the government's share is 22½ per cent of the commitment fee.
90 per cent, the government's share is 25 per cent of the commitment fee.

The amount of loans which a contractor will be entitled to obtain in the event of cancellations of his contracts will be stated in the loan agreement as a percentage of inventories, work in process, accounts receivable, and (without duplication) amounts paid or concurrently to be paid by him to subcontractors or suppliers by reason of contract cancellations.

Present, Past and Pending

■ COAL STRIKE LEADERS DRAW SUSPENDED SENTENCES

PITTSBURGH—Twenty-seven coal strike leaders who pleaded no contest to charges of violating the Smith-Connally antistrike law were given suspended sentences of six months and placed on probation for three years by Federal Judge F. P. Schoonmaker. Three others indicted on the same charge were unable to appear in court.

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■ HAIRLIKE STEEL WIRE USED FOR RECORDINGS

SCHENECTADY, N. Y.—Hairlike steel wire is being used in a new type of sound recorder by observation planes in overseas war zones, according to General Electric Co. More than an hour of continuous speech can be magnetically recorded on 11,500 feet of wire wound on a spool no larger than a doughnut.

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■ FACTORY WAGES UP 82.4 PER CENT SINCE WAR STARTED

NEW YORK—Factory workers' wages have increased 82.4 per cent on a weekly basis since the war started, according to the National Association of Manufacturers. Increase in "real" wages has been 44 per cent.

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■ CLEVELAND BANS IN-MIGRANT WORKERS FOR 60 DAYS

CLEVELAND—In-migration of workers to this war production center has been banned for 60 days to relieve congestion in housing and other facilities by the War Manpower Commission's labor-management committee.

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■ WASHING MACHINE PRODUCTION MUST WAIT UNTIL 1944

WASHINGTON—Production of a limited number of washing machines to meet minimum civilian needs must wait until 1944, members of the industry have been advised by WPB. However, manufacture of repair parts may be permitted earlier.

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■ H. G. PORCH RETIRES AS LUKENS SALES MANAGER

COATESVILLE, PA.—Harry G. Porch, since 1900 manager of sales at Boston for Lukens Steel Co., has retired. He is succeeded by R. H. McCracken, formerly with the sales department, Central Iron & Steel Co., Harrisburg, Pa.

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■ BLAST FURNACE CONSTRUCTION LAGGING

WASHINGTON—Blast furnace expansion program as of Sept. 1 was 3,000,000 tons behind the original schedule. Under the original plan, construction was to have been completed by July 1; it now appears the program will not be completed until next March.

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■ FORGINGS SOLD BY WAREHOUSES CONTROLLED MATERIALS

WASHINGTON—Steel forgings sold by warehouses are controlled materials whether they are made by a steel producer or forging shop, WPB ruled in announcing Direction 25 to CMP Regulation No. 1. Warehouse orders for forgings must be accompanied by form WPB 2333, formerly CMP 11.

WLB Raises Self Above State Law

Board holds its rulings take precedence in opinion involving Wisconsin employment peace act

RULINGS of the National War Labor Board supersede acts of state legislatures in labor relations matters in time of war. This is the opinion of the board, written by Wayne Morse, public member, in a case involving conformity of a WLB order to Wisconsin employment peace act.

The opinion was given in the case of the J. Greenebaum Tanning Co., which had been directed by the board to grant a maintenance of membership contract to a CIO union but had objected on the ground the board's order conflicted with the Wisconsin statute. The state law provides that an agreement for union security is invalid unless approved by three-fourths or more of the employes.

"No law of a state which is aimed at inserting conditions in a collective bargaining contract between an employer and the bargaining agent of the employes can be said to supersede any order of the War Labor Board regulating relations between employer and employe in time of war when the power to issue that regulation flows from the war powers of the United States," Mr. Morse wrote.

In a second policy-making action the board assumed jurisdiction over a threatened jurisdictional strike at the Allis-Chalmers Mfg. Co. plant at Springfield, Ill., under Smith-Connally antistrike act.

Portal-to-Portal Wage Refusal Explained by WLB

An explanation of its refusal to approve payment of an extra $1.25 a day to Illinois coal miners for the time they pass traveling underground to and from work was given last week by the War Labor Board. The board held:

1. "The mine workers are not entitled to extra compensation under the fair labor standards act (wage and hour law) until the weekly working time exceeds 40 hours."

2. The miners failed to establish that the $1.25 was "not an indirect wage increase in violation of wage stabilization policies."

WLB Chairman William H. Davis said that in the proposed settlement "the figure of $1.25 per day is arrived at by processes of rationalization which wholly ignore the fact that the mine workers are not entitled to extra compensation under the fair labor standards act."

Steel for Sale Output Up in July

Exceeds June total but falls short of May. . . Bars, plates lead tonnage. . . Aircraft tubing makes gain. . . Practically all important products score increase

PRODUCTION of steel and iron for sale in July totaled 5,488,735 net tons, against 5,464,593 tons in June, according to the American Iron and Steel Institute. For the first seven months this year production aggregated 38,681,830 tons. July production also included 722,989 tons of pig iron for sale, 83,182 tons of ingot molds and 16,654 tons of iron products, including bars, pipe and tubes.

Practically all important steel products showed an increase over June output, mainly the result of the extra day, but this was not sufficient to equal production of May, 5,586,447 tons.

Bars continued to lead in tonnage, 1,088,522 tons in July, 1,087,241 in June, with plates, including sheared and universal, 1,051,288 tons in July, 1,004,005 in June. Total sheets, including all kinds, hot and cold-rolled and galvanized, were 703,350 tons in July, 695,833 in June.

Plate production was at 135 per cent of rated capacity, bars at 87.2 per cent and sheets at 61.5 per cent, the latter low mark being the result of much sheet capacity being on plate production.

The only products except plates which exceeded rated capacity were mechanical tubing, of which the aircraft industry requires large quantities, and tool steel bars, demand for which is heavy to equip the expanded machine tool equipment now in use. Output of mechanical tubing in July was 61,978 tons, representing 122.3 per cent of capacity, compared with 61,573 tons in June. Tool steel bars represented 17,263 tons in July, 101.4 per cent of capacity, against 19,231 tons in June.

During July 419,723 tons of steel prod-

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

JULY - 1943 (PERIOD)

		Number of Furnaces	Item	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	Year to Date: Total	Year to Date: Per Cent of capacity	Year to Date: Shipments: Export	Year to Date: Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	44	1	xxxxxxx	546,031	xxx		196,970	4,673,381	xxx		1,371,097
	Heavy structural shapes	10	2	3,412,580	298,291	69.0		xxxxxxx	2,185,006	69.5		xxxxxxx
	Steel piling	4	3	338,000	8,517	29.7		xxxxxxx	22,581	11.5		xxxxxxx
	Plates—Sheared and Universal	21	4	9,189,740	1,051,288	135.0		3,288	7,451,113	139.5		22,668
	Skelp	6	5	xxxxxxx	57,240	xxx		41,808	468,479	xxx		279,628
	Rails—Standard (over 60 lbs.)	4	6	5,529,250	148,096	46.1		xxxxxxx	1,041,265	49.4		xxxxxxx
	Light (60 lbs. and under)	6	7	309,690	21,047	81.2		xxxxxxx	102,806	57.1		xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	102,000	2,438	28.2		xxxxxxx	15,325	25.9		xxxxxxx
	Splice bar and tie plates	13	9	1,120,270	46,235	48.7		xxxxxxx	370,108	56.9		xxxxxxx
	Bars—Merchant	40	10	xxxxxxx	294,555	xxx		80,640	4,141,966	xxx		225,232
	Concrete reinforcing—New billet	15	11	xxxxxxx	39,251	xxx		xxxxxxx	223,404	xxx		xxxxxxx
	Rerolling	16	12	xxxxxxx	6,141	xxx		xxxxxxx	33,542	xxx		xxxxxxx
	Cold finished—Carbon	23	13	xxxxxxx	148,387	xxx		xxxxxxx	1,082,919	xxx		xxxxxxx
	Alloy—Hot rolled	20	14	xxxxxxx	251,419	xxx		34,816	1,776,425	xxx		24,004
	Cold finished	19	15	xxxxxxx	39,871	xxx		xxxxxxx	280,308	xxx		xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	8,798	xxx		xxxxxxx	60,130	xxx		xxxxxxx
	TOTAL BARS	63	17	14,719,585	1,088,522	87.2		115,456	7,591,795	88.8		817,536
	Tool steel bars (rolled and forged)	17	18	200,840	17,263	101.4		xxxxxxx	137,050	117.5		xxxxxxx
	Pipe and tube—B. W.	15	19	2,231,040	109,936	58.1		xxxxxxx	764,953	59.0		xxxxxxx
	L. W.	8	20	849,400	44,704	62.4		xxxxxxx	327,615	66.7		xxxxxxx
	Electric weld	8	21	1,149,250	82,906	85.1		xxxxxxx	502,301	90.2		xxxxxxx
	Seamless	15	22	3,082,400	180,225	69.0		xxxxxxx	1,241,693	69.3		xxxxxxx
	Conduit	7	23	100,000	4,003	24.9		xxxxxxx	35,365	32.0		xxxxxxx
	Mechanical Tubing	11	24	507,800	61,978	122.3		xxxxxxx	435,654	125.4		xxxxxxx
	Wire rods	22	25	xxxxxxx	98,506	xxx		19,422	696,377	xxx		138,255
	Wire—Drawn	41	26	2,355,350	164,120	82.2		5,970	1,139,387	83.2		35,047
	Nails and staples	19	27	1,116,640	55,923	59.6		xxxxxxx	490,504	72.6		xxxxxxx
	Barbed and twisted	15	28	482,280	20,480	50.1		xxxxxxx	142,567	50.9		xxxxxxx
	Woven wire fence	16	29	778,060	23,224	35.2		xxxxxxx	129,626	28.7		xxxxxxx
	Bale ties	12	30	128,420	9,929	91.2		xxxxxxx	65,414	87.7		xxxxxxx
	All other wire products	8	31	78,220	4,535	68.4		xxxxxxx	35,624	78.4		xxxxxxx
	Fence posts	11	32	112,065	5,356	56.4		xxxxxxx	19,289	29.5		xxxxxxx
	Black plate	10	33	339,700	27,496	92.5		-	175,398	88.9		-
	Tin plate—Hot rolled	4	34	483,620	1,046	2.6		xxxxxxx	10,597	3.8		xxxxxxx
	Cold reduced	10	35	3,841,340	207,571	63.7		xxxxxxx	1,283,830	57.5		xxxxxxx
	Sheets—Hot rolled	40	36	xxxxxxx	487,541	xxx		19,428	3,505,278	xxx		119,664
	Galvanized	14	37	xxxxxxx	67,259	xxx		xxxxxxx	459,148	xxx		xxxxxxx
	Cold rolled	14	38	xxxxxxx	120,426	xxx		xxxxxxx	858,251	xxx		xxxxxxx
	All other	15	39	xxxxxxx	28,124	xxx		xxxxxxx	211,192	xxx		xxxxxxx
	TOTAL SHEETS	28	40	13,497,570	703,350	51.5		19,428	5,043,869	64.3		119,664
	Strip—Hot rolled	22	41	3,201,690	120,425	44.4		17,381	886,327	47.7		102,749
	Cold rolled	39	42	2,059,740	100,355	57.5		xxxxxxx	668,476	55.9		xxxxxxx
	Wheels (car, rolled steel)	7	43	424,820	19,270	23.5		xxxxxxx	131,133	53.1		xxxxxxx
	Axles	6	44	433,470	11,784	30.7		xxxxxxx	95,078	36.1		xxxxxxx
	Track spikes	11	45	308,350	9,428	36.1		xxxxxxx	85,492	47.7		xxxxxxx
	All other	5	46	xxxxxxx	16,415	xxx		xxxxxxx	116,352	xxx		xxxxxxx
	TOTAL STEEL PRODUCTS	159	47	xxxxxxx	2,488,735	xxx		419,723	38,681,830	xxx		2,806,644
	Pig iron, ferro manganese and spiegel	25	48	xxxxxxx	722,989	xxx		356,264	5,206,248	xxx		2,493,647
	Ingot moulds	3	49	xxxxxxx	83,182	xxx		xxxxxxx	562,451	xxx		xxxxxxx
Iron Products	Bars	10	50	170,110	8,000	55.5		291	57,212	57.9		1,970
	Pipe and tubes	2	51	106,000	7,489	83.3		xxxxxxx	91,175	83.1		xxxxxxx
	All other	1	52	36,400	1,165	24.5			8,505	25.1		-
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	xxxxxxx	16,654	xxx		291	116,892	xxx		1,970

ucts were shipped to other members of the industry for conversion into further finished products. In seven months such shipments totaled 2,886,644 tons.

Companies included in these statistics numbered 183 and in 1942 represented 98.8 per cent of total output of finished rolled products. Adhering to government policy export figures can not be published and these columns are blank in the accompanying table, which supplies full statistics for July and cumulative figures for seven months.

Inland Steel's New Ovens Produce 1000 Tons of Coke

Seventy-three by-product coke ovens went into operation recently to produce about 1000 tons of coke daily at the Indiana Harbor plant of the Inland Steel Co.

The ovens are part of a project undertaken for the Defense Plant Corp. by the company. Project consists of two blast furnaces and related facilities, including also a second battery of coke ovens.

Canadian Steel, Pig Iron Output Higher in July

Production of steel and iron in Canada in July was higher than in June, but output continues to range on a lower level than the records made last year, the Dominion Bureau of Statistics reports. In July pig iron output was at 70.8 per cent of rated capacity, compared with 98.3 per cent in the corresponding month last year; steel ingot and castings production was at 85.11 per cent in July, compared with 89.5 a year ago.

During July a new blast furnace was lighted, making a total of 13 for the Dominion, with rated capacity of 2,348,160 tons annually. The new furnace is at the Sydney, N. S., plant of the Dominion Steel & Coal Corp. Another blast furnace, said to be the largest in the British Commonwealth, will be blown in soon at the Sault Ste. Marie plant of Algoma Steel Corp.

Production figures for July, with comparisons, in net tons, are as follows:

	Steel ingots, castings	Pig iron	Ferro-alloys
July, 1943	250,508	151,369	21,408
June, 1943	239,501	147,889	18,151
July, 1942	256,560	172,153	15,961
7 Mos. 1943	1,749,661	1,019,158	133,201
7 Mos. 1942	1,815,798	1,146,153	124,561
7 Mos. 1941	1,507,141	814,862	118,136

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Sept. 14	Change	Same Week 1942	Same Week 1941
Pittsburgh	99.5	+1	94	98
Chicago	99.5	+0.5	101.5	101
Eastern Pa.	95	None	95	95
Youngstown	98	None	97	96
Wheeling	98	−5	83	94
Cleveland	94	−5	96.5	95
Buffalo	90.5	None	90.5	90.5
Birmingham	95	None	93	95
New England	92	−5	92	90
Cincinnati	94	+2	95	89
St. Louis	73	−16	95.5	98
Detroit	90	+7	86	86
Average	99	+0.5	*98	*95.5

*Based on steelmaking capacities as of these dates.

Steel Production Advances to 99%

Completion of open-hearth furnace repairs boosts ingot production at leading centers

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week recorded a slight gain of one-half point to 99 per cent of capacity.

A year ago the national rate was 98 per cent; two years ago it was 95.5 per cent, both based on capacities as of those dates.

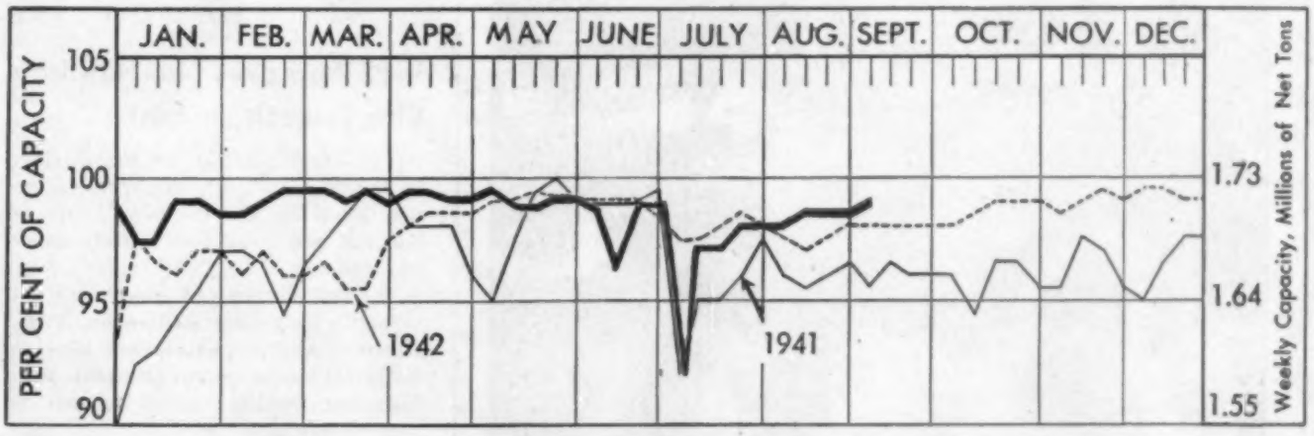
Completion of open-hearth furnace repairs raised steel ingot operating schedules during the latest period at Pittsburgh, Chicago, Detroit and Cincinnati. Gains in these areas more than offset lower operating schedules in the Cleveland, Wheeling and St. Louis districts.

A strike at Granite City Steel Co., resulting from a controversy about the 48-hour week, lowered the St. Louis district's steel rate 16 points to 73 per cent last week.

Blast furnace operations in the Buffalo district are expected to slip six points this week as the Hanna Furnace Co. is scheduled to blow out a furnace for relining. The reverse situation is anticipated soon in the Youngstown area with the placing of an additional blast furnace in operation expected this week.

Carnegie-Illinois Steel Corp.'s Edgar Thomson "E" blast furnace has been blown out.

COMPARATIVE STEEL INGOT OPERATIONS



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,424	6,826	7,670	7,374	7,545	7,027	7,376	....	....	....	....	....
1942	7,112	6,512	7,892	7,122	7,382	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	5,035	5,178	4,836	5,023	....	....	....	....	....
1942	4,983	4,500	5,035	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5.083	5.201
1941	4,666	4,206	4,702	4,340	4,396	4,551	4,766	4,784	4,721	4,860	4,707	5,014

Fall Scrap Drive Planned To Prevent Winter Supply Shortage

Normal cold-weather decline in collections coupled with labor scarcity in dealers' yards prompt government action. . . . Nationwide salvage campaign scheduled to start Oct. 1 and continue through Nov. 15

FEAR of a possible iron and steel scrap shortage this winter has prompted the War Production Board and the scrap industry to plan a new nationwide salvage campaign. The drive is scheduled to start Oct. 1 and continue through Nov. 15.

While supplies have been fairly easy in recent months, WPB officials believe the scarcity of workers in dealers' yards and the normal decline in collections when cold weather begins may cause stocks to become inadequate. Many dealers have only 33 to 60 per cent of normal working forces, a recent survey indicated.

John D. Whiting, WPB Steel Division director, in a letter to steel mills and foundries asked full support for local salvage committees and urged companies to build up large inventories.

Warning that the government must aid the dealers in maintaining labor forces sufficient to collect, prepare and ship scrap, E. C. Barringer, president, Institute of Scrap Iron and Steel Inc., recently told the War Manpower Commission:

"The situation is genuinely serious and calls for immediate correction, especially in view of the false sense of security concerning the supply of scrap."

More Battlefield Scrap Arriving

An increasingly important source for scrap is seen in the rising volume of salvage returned from overseas. This salvage flow has risen to a point where it requires special handling. Segregation centers have been established near two major ports and other centers are being constructed. Army Service Forces have established detailed policies for handling the returned material, which is discharged onto lighters or cars at the port to avoid clogging which might delay the outward flow of men and material.

At the segregation centers, a threefold job is performed:

1. Repairable property is sorted out and sent to the proper installations for repair and re-issue.

2. Careful check is made to see that no material of an explosive nature is contained in scrap when sold. As an additional safety factor, no sale is permitted of material that may prove to be of explosive nature in the course of remelting. Fired cartridge cases are forwarded to an Army installation where they are "popped" or deprimed to eliminate any explosive charge that may remain in the detonator.

3. Remaining scrap is sold by bids in accordance with Army regulations. The Army sells this substantially in the form received and the scrap industry performs its usual functions to cutting the metal to suitable size and sorting to OPA specifications.

Scrap stocks and consumption varied only slightly during the first six months this year. Summary of stocks and consumption:

Stocks at end of Month
(000 omitted)

	Scrap		
	Purchased	Home	Pig iron
June, 1943	5,385	1,531	1,374
May, 1943	5,414	1,491	1,328
Apr., 1943	5,416	1,502	1,327
Mar., 1943	5,343	1,507	1,350
Feb., 1943	5,354	1,517	1,370
Jan., 1943	5,401	1,476	1,502
Dec., 1942	5,501	1,429	1,272
Nov., 1942	5,363	1,379	1,191
Oct., 1942	4,956	1,304	1,130

Consumption during Month

	Scrap		
	Purchased	Home	Pig iron
June, 1943	1,944	2,549	4,239
May, 1943	2,053	2,670	4,511
Apr., 1943	2,019	2,623	4,423
Mar., 1943	2,102	2,685	4,660
Feb., 1943	1,857	2,321	4,162
Jan., 1943	1,942	2,550	4,515
Dec., 1942	2,016	2,481	4,465
Nov., 1942	1,905	2,496	4,360
Oct., 1942	2,061	2,709	4,594

POLITICS AND STEEL: Thomas E. Dewey, New York's governor and favorite Republican candidate for the presidency in most polls, gets his first view of steel mill operations at the Buffalo plant of Republic Steel Corp. At his left is Frank C. Farrell, Republic's Buffalo district manager, and at his right, Donald B. Gillies, Republic vice president

WPB Approves Two New Iron Ore Projects in East

Two new iron ore mining projects have been approved by the War Production Board for Defense Plant Corp. financing, and a third is actively under consideration.

The largest approved project involved is the Croton deposit at Brewster, N. Y., where Croton Magnetic Mines Inc. has 8,000,000 tons of proven magnetite, with indication that the actual tonnage is much larger.

This ore, containing 30 per cent iron in the natural state, will be crushed, concentrated and sintered to an average analysis of 65 to 66 per cent iron for the most part, but as much of it as desired will be reground, reconcentrated and resintered to an analysis of 70 per cent or more iron, with phosphorus 0.01 per

cent and silica 0.25 per cent.

Output is to be about 500,000 tons of sintered concentrate annually, equivalent to 650,000 tons of lake ore.

The other approved project involves a deposit of magnetite near Boyertown, Pa., to be operated by the Boyertown Iron Mine Co., Boyertown. This deposit is similar to the famous Pennsylvania Cornwall ore. It is a 36 per cent ore which is to be crushed, concentrated and sintered to an analyses of 61 to 62 per cent iron, 0.05 per cent phosphorus and 5 per cent silica. Thus, it is well within bessemer limits. Output of sintered concentrate will range somewhere between 200,000 and 250,000 tons annually. Although the size of this deposit is not yet definitely known, enough ore has been proved to make it certain that this will be a self-liquidating venture; it is expected to yield several million tons before exhaustion.

Deposit Reportedly Large

The project under study involves a large deposit owned by The Scotia Mining Co., Scotia, Pa., in which iron ore and clay occurs in a mixture of about 4 to 6 parts of clay to one of iron ore. The plan is to install a sink-float and log washer plant, thus concentrating the ore by washing out the clay. The concentrated product would contain 50 per cent or more iron, 9 per cent silica and the phosphorus content would be low. The plan calls for annual production of 400,000 tons of concentrate. While this deposit is known to be large, its exact size is not known. The Bureau of Mines continues its exploration work at Scotia.

It is possible that additional iron mining projects will be recommended. The Bureau of Mines, by virtue of its increased appropriation for the 1943-1944 fiscal year, is launching an extensive geophysical program to determine the extent and quality of mineral deposits over large areas.

Third War Loan Drive To Be Launched Sept. 9

Third War Loan campaign, designed to sell $15,000,000,000 in war bonds to nonbanking sources, will be launched by the Treasury Department, Sept. 9.

Slogan for the drive will be "Back the Attack with War Bonds."

The goal for the third loan campaign represents the largest financing program in the history of the world. The campaign will continue for three weeks.

In the Second War Loan, Americans, including banks, invested $18,533,000,000 in bonds, more than $5,000,000,000 in excess of the announced objective. More than 33,000,000 sales of "E" bonds to individuals were reported.

Introducing New NE 8600 Grade

Materials Conservation Committee asks metal of the 0.15 to 0.25 per cent molybdenum range be considered wherever practicable. . . Held comparable to NE 8740

INTRODUCTION of a new National Emergency steel of the 8600 series to be comparable to NE 8740 but with a molybdenum content of 0.15 to 0.25 per cent has been announced by the Operating Committee on Aircraft Materials Conservation.

Although steel conforming to AN-S-15 and AN-S-16 will continue to be available for aircraft uses, the committee asks that where new tests for new applications are to be conducted, consideration be given to testing compositions of the 0.15 to 0.25 per cent molybdenum range wherever practicable.

Specifications approved by joint action of the Army Air Forces, Navy Bureau of Aeronautics, and Aircraft Resources Control Office, Aircraft Production Board include the following:

A. Steel Bar and Rod

(1) AN-S-13, (0.18 to 0.23 carbon) chrome-nickel-molybdenum. Equivalent to NE 8620. Primarily for carburizing, as an alternate for such steels as SAE 2317, 3120, 4119, 4620 and 6120.

(2) AN-S-14, (0.27 to 0.33 carbon) chrome-nickel-molybdenum. Equivalent to NE 8630. Acceptable as an alternate for AN-QQ-S-684 (SAE X4130) in all applications; for SAE 2330 (AN-QQ-S-689), 3130, 4037 (AN-S-9), and 6130.

(3) AN-S-15, (0.33 to 0.38 carbon) chrome-nickel-molybdenum. Equivalent to NE 8735.

(4) AN-S-16, (0.38 to 0.43 carbon) chrome-nickel-molybdenum. Equivalent to NE 8740. Similar welding characteristics to SAE 4140 steel. Acceptable as an alternate for the steels already mentioned above, if necessary to obtain specified higher mechanical properties in larger sections, and for such steels as SAE 2335, 2340, 3135, 3140 (AN-QQ-S-690), 4135, 4140 (AN-QQ-S-752), 4640, 6140, and 6150 (AN-QQ-S-687). It is desirable that arrangements be made with the steel producers to aim for the lower range of molybdenum, i.e., 0.20 to 0.25 per cent.

B. Steel Sheet and Strip

(1) AN-S-12, (0.27 to 0.33 carbon) chrome-nickel-molybdenum. This steel is intended primarily as a weldable alternate for SAE X4130 sheet and strip (AN-QQ-S-685).

(2) AN-S-22, (0.33 to 0.38 carbon) chrome-nickel-molybdenum. This steel is intended primarily as an alternate for SAE 4135 sheet, strip (AN-QQ-S-686).

C. Steel Tubing

(1) AN-T-15, Seamless (0.27 to 0.33 carbon) chrome-nickel-molybdenum. This steel is intended primarily as weldable alternate for SAE X4130 seamless tubing (AN-WW-T-850).

(2) AN-T-33, Welded, (0.27 to 0.33 carbon) chrome-nickel-molybdenum. This steel is intended primarily as a weldable alternate for SAE X4130 welded tubing (AN-T-3). Provided the inside flash does not interfere with its intended application, this tubing and tubing conforming to AN-T-15 are acceptable as being interchangeable for all applications.

(3) AN-T-22, Seamless (0.33 to 0.38 carbon) chrome-nickel-molybdenum. This steel is intended primarily as an alternative for SAE 4135 seamless tubing (AN-WW-T-852).

The nickel content in the above mentioned specifications is being increased from a range of 0.40 to 0.60 to a range of 0.40 to 0.70 per cent.

Seeks Clear Definition of "Industry" in Planning

Asserting proposed appointment of a co-ordinator for the plans of various government agencies and departments on the reconversion of industry and agriculture to a peacetime basis, once the war is ended, would be timely, George A. Sloan, New York city commissioner of commerce and chairman of the mayor's Business Advisory Committee, declared recently one of the first responsibilities of the co-ordinator "should be to make clear what is meant by 'industry' when we speak of postwar responsibility."

Time Revised for Placing Steel Castings Orders

Time allowed by WPB between placement of steel castings orders and first day of the month in which delivery is requested has been lengthened under CMP regulation No. 1. Distinction now is made between carbon and alloy steel castings.

Following is the new time table for new carbon steel and new alloy steel requirements, respectively: 500 pounds and over, 45 and 60 days; over 500 to 5000 pounds, 60 and 75 days; over 5000 to 30,000 pounds, 75 and 90 days; over 30,000 pounds, 90 and 105 days.

WINDOWS of WASHINGTON

Heavier Business Taxes?

TAX EXPERTS in close contact with members of the House whose views usually predominate in formulating tax laws think it a safe bet that the next act will call for an increase of about four billion dollars of revenue to be obtained from higher income taxes on corporations and increases in excise taxes. Higher taxes on incomes of individuals are not believed likely. Support for a 10 per cent general retail sales tax appears to be growing. There are a number of proposals whose fate is not yet determined. By one of them $60,000,000 would be raised by a tax on checks. Another, aimed not only at raising revenue but also at helping to reduce congestion on the railroads, calls for a 33⅓ per cent tax on pullman fares.

Makes Nice Pile

Recently a large corporation, acting under one of the War Production Board's regulations, sent out questionnaires to some 22,000 customers. After putting the replies through the office machinery this corporation sent to Washington a sheaf of sheets approximately two feet square and about six inches deep. This batch of statistics was received on Aug. 10 and WPB officials since have discovered that nobody in the WPB has made any use whatever of the material. As a result of this episode another drive to reduce paper work by industry has been launched.

Getting Homesick?

Accelerated departure from Washington of many members of the War Production Board organization has forced more concentrated attention to the growing need to decentralize the board's activities. Many of the functions of the board can be handled more effectively out of regional and district offices than in Washington. Early action in the direction of decentralization is expected because many more people are eager to go "back home".

Cutbacks Easing

Future terminations and cutbacks of war contracts will be much less disturbing to production lines than in the early months of 1943. Tank production may be cut back further but not much. Heavy ammunition is not being expended as rapidly as expected and will be cut back. There is a possibility that small arms and ammunition may be cut back somewhat. Programs that will not be cut back include ships, high-octane gasoline, synthetic rubber, most heavy and light artillery, tank-borne guns, bombs of the various types. Programs to be stepped up include aircraft, large Army trucks, railroad equipment and supplies, rayon tire cores, tire manufacturing facilities. . . . New construction is declining and by end of 1943 will be at approximately peacetime level. Machine tool manufacture is dropping sharply and by the end of 1943 will be at approximately 30 per cent of capacity.

RENEGOTIATION DIVISION

Due to growing pace and scope of the War Department's price renegotiation program, the War Department Price Adjustment Board was set up as of Sept. 1, as a Staff Division of the Army Service Forces, known as the Renegotiation Division.

The change is administrative and does not affect personnel.

The division will continue renegotiating contracts in co-operation with private industry, which to date has resulted in recoveries and price reductions on Army work amounting to nearly two and three-quarters billion dollars. Added to the results obtained by the price adjustment units of other agencies, the total is nearly four billion dollars. Latest available exact total, as of July 31, 1943, is $3,955,845,000, of which the Army portion was $2,743,500,000.

Might Be Effective

A War Production Board official thinks smart manufacturers might better their labor position by advertising in their local newspapers for "carpenters," "masons," "plumbers" rather than for "machinists," "welders," "turret lathe operators." With new construction work falling off rapidly many building tradesmen, as well as workers in plants manufacturing building materials, are idle and many more will be without work as the year approaches its end.

Need Boypower

When War Manpower Commissioner Paul V. McNutt last week called on the millions of high school and other students to continue working in industry on a part-time basis when they go back to school in September, it was the first official acknowledgment of the part these boys played during the summer of 1943 in preventing a much worse labor situation than actually developed. Their departure from full-time jobs will create many problems.

Picture Too Bright

So strong a case was developed for synthetic gasoline to be produced from coal and lignite when the O'Mahoney War Minerals Subcommittee held hearings at Salt Lake City, Utah, and Sheridan, Wyo., recently, that governors and other prominent persons in Western states expressed curiosity over the fact such a synthetic gasoline program had not been launched a good many years ago. Representatives of the United States Bureau of Mines and other witnesses not only spoke about wonderful future possibilities but about what actually has been accomplished in past years to pave the way for a synthetic industry. They sold a fine bill of goods but there will be considerable difficulty in delivering. A vast amount of investigation remains to be undertaken before we can have a synthetic gasoline and motor fuel industry based on coal and lignite.

Bright Spot

One of the bright spots in the military picture is that we are losing far fewer aircraft in combat than was expected. The rate of attrition was expected to be as high as 20 per cent. Actually it is around 8 per cent. Improvements that continually are being made in our aircraft will reduce the rate even below this figure.

Not That Easy

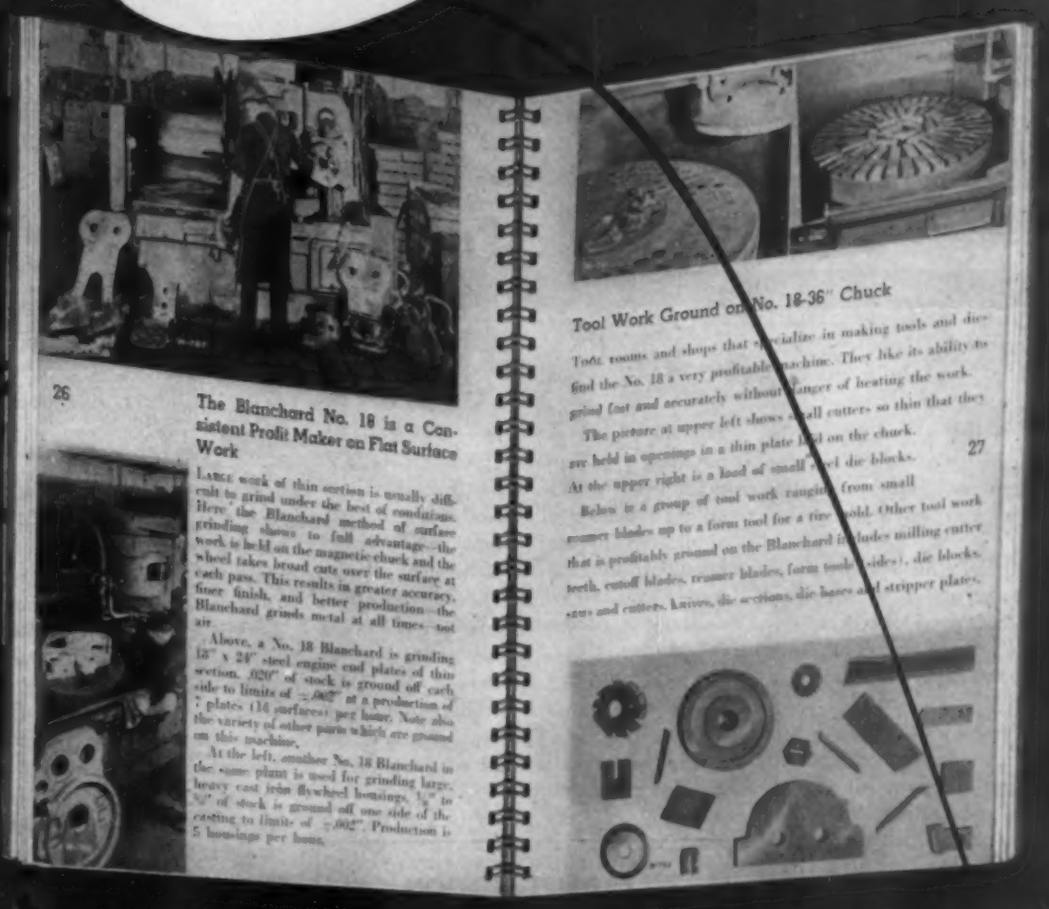
Hearing that the supply of aluminum now is easier, a number of manufacturers have approached the War Production Board for permission to resume production of aluminum pots and pans and other goods. They are told that the situation is not that easy. The Aluminum and Magnesium Division reports growing acuteness of the problem of keeping aluminum producing plants manned by sufficient labor makes it necessary to husband all supplies for the war program.

Paper Shortage

An extremely critical shortage of pulp and paper is the next warfare emergency on the calendar. Inventories are being used up at a dangerous pace. Cause is depletion of lumberjacks by drafting them into the armed forces or by their finding employment in other industries. War Production Board is taking action to get more men back into the forest and is trying to find more trucks, power saws and other equipment for their use. Even so, paper will be scarce and a system somewhat like the Controlled Materials Plan now is being devised to secure equitable distribution.

FREE

THE BLANCHARD WORK BOOK



26

The Blanchard No. 18 is a Consistent Profit Maker on Flat Surface Work

LARGE work of thin section is usually difficult to grind under the best of conditions. Here the Blanchard method of surface grinding shows to full advantage—the work is held on the magnetic chuck and the wheel takes broad cuts over the surface at each pass. This results in greater accuracy, finer finish, and better production—the Blanchard grinds metal at all times—not air.

Above, a No. 18 Blanchard is grinding 18" x 24" steel engine end plates of thin section. .020" of stock is ground off each side to limits of ±.002" at a production of 7 plates (14 surfaces) per hour. Note also the variety of other parts which are ground on this machine.

At the left, another No. 18 Blanchard in the same plant is used for grinding large, heavy cast iron flywheel housings. ⅛" to ⅜" of stock is ground off one side of the casting to limits of ±.002". Production is 5 housings per hour.

Tool Work Ground on No. 18-36" Chuck

Tool rooms and shops that specialize in making tools and dies find the No. 18 a very profitable machine. They like its ability to grind fast and accurately without danger of heating the work.

The picture at upper left shows small cutters so thin that they are held in openings in a thin plate fixed on the chuck.

At the upper right is a load of small steel die blocks. 27

Below is a group of tool work ranging from small trimmer blades up to a form tool for a tire mold. Other tool work that is profitably ground on the Blanchard includes milling cutter teeth, cutoff blades, trimmer blades, form tools (sides), die blocks, saws and cutters, knives, die sections, die bases and stripper plates.

Whether or not you now own a Blanchard Surface Grinder, the Blanchard Work Book will show you how to handle your surface grinding jobs more easily, accurately, and economically. There are 80 pages, spiral bound for your convenience, packed full of production data and information on grinding small or large lots. The coupon is for your convenience—Write for your Work Book TODAY!

COUPON

Without obligation, please send me the Blanchard Work Book.

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BLANCHARD

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64 STATE STREET, CAMBRIDGE, MASS.

CMP HITS BULLSEYE; FILLING NEEDS

Early skepticism as to stability of program vanishing. Changes to be made only as experience shows tangible benefits to result

J. A. KRUG

Program vice chairman who has general supervision over distribution of materials. OWI photo

WHAT success is the Controlled Materials Plan meeting in directing critical materials into maximum production of war products and essential civilian goods?

After two months' full operation under the plan the consensus in both governmental and industrial circles is that it is meeting, and likely will continue to meet, expectations fully and satisfactorily.

Recent decision of officials in Washington to limit classification changes in the official class B product list to only nine instead of converting the entire list to class A has dispelled the last vestige of doubt among industrial buyers as to the future form of governmental control over production and distribution of critical materials. It has quieted widespread criticism of continual changes in the regulations and restored confidence in the stability of the plan as it now stands.

Under direction of J. A. Krug, as WPB program vice chairman, Harold J. Boeschenstein, director, Production Controls Bureau, and Walter C. Skuce, director, Controlled Materials Plan Division, the program has been placed on an efficient operating basis.

Mr. Krug is authorized to direct and supervise various units and functions of WPB, including the Production Controls Bureau. This bureau develops policies, plans, and general methods for controlling distribution of materials, for scheduling production and delivery of products, and for controlling inventories. The director is primarily responsible for initiating appropriate priorities regulations, CMP regulations, regulations governing scheduling, and other regulations applicable to more than one industry for controlling the distribution of materials, for scheduling production and delivery of products, and for controlling inventories.

The Controlled Materials Plan Division is charged with recommending policies, plans, and general methods for controlling the distribution of materials, and for maintaining a continuous review of the overall operations under resulting directives.

"Experience in operation of CMP indicates it is basically sound and, consequently, changes in the plan in the future will be limited in scope and will be made only as experience makes it clear that tangible benefits are to be derived," Mr. Krug said recently.

"Attention must now be directed toward better administration and operation of the plan both within government and on the part of industry," he continued, "in order to improve requirements data, to improve allotment procedure, and to improve the authorization of production schedules for extended periods. Much improvement must also be made in placement of delivery orders to cover scheduled requirements for advance quarters so that better planning and scheduling may be accomplished."

Industry approval of the plan has been general for several weeks but many executives have been skeptical in view of the serious consideration given the recent proposal to shift the entire class B product list to the "A" list. This move would have put all the various standard component parts and civilian items under military control.

Opposition to any such change was overpowering and resulted in restrict-

PROMPT ACTION

Prime and secondary consumers of controlled materials who make allotments to their suppliers were urged recently by Walter C. Skuce, director of CMP Division, to make their allotments as soon as they are in a position to do so.

"In cases where consumers receive advance allotments of controlled materials, they should likewise make advance allotments to their suppliers in order to permit the placement of orders as early as possible," he said.

"Failure to place orders and make allotments promptly could interrupt the flow of materials and parts to end-product programs."

HAROLD J. BOESCHENSTEIN

Director of Production Controls Bureau who develops policies for scheduling production. Photo by Blackstone studios

WALTER C. SKUCE

Director of Controlled Materials Division who recommends plans for controlling material distribution

ing the classification changes to nine. This would indicate that officials charged with administration of the plan have heeded industry's claim that while members of the CMP organization can adjust their activities smoothly and quickly to any change in procedure it takes several months for individual members of industry to make similar adjustments.

Revision in the CMP class B product list, effective beginning with the first quarter operations in 1944, represents the final action with respect to any major class B product classification. Industrialists now may concentrate their energies on production problems. This had not been possible during the past two years when valuable time and effort was devoted to solving numerous supply and distribution problems arising from frequent changes in procedure under CMP, PRP and previous priority programs.

Although WPB officials have announced that the plan has undergone its final major alteration, it retains one of its most important characteristics—that of flexibility. Directives will continue to be issued by WPB, altering the flow of materials as necessity dictates. Minor adjustments also will be made in procedure of operation under the various regulations but the fundamental principles will be maintained.

CMP officials, acting often on suggestions made by industry, have simplified the reporting procedure whenever possible. Simplification of reports is an important phase of WPB's program to improve requirements data.

The latest example of this is the issuance of form CMP-32 which is the form to be used for reporting return of allotments. It is being made available to all manufacturers, both prime consumers and secondary consumers, in order that there may be a standard form and a standard procedure for returning unusable allotments of controlled materials to claimant agencies, industry divisions, or customers from whom they previously have received allotments.

Form CMP-32 should be used when: (1) The consumer finds that he has received an allotment of controlled materials which is greater than actually required for the quarter indicated; (2) contracts have been cancelled or reduced after receipt of allotments; (3) production (or construction) is disrupted by strikes, floods, labor shortages, etc.; (4) the consumer fills a substantial portion of any of his requirements, covered by an allotment, through the acquisition of controlled material, in any other manner than by use of the allotment; (5) the consumer finds that his inventory plus acceptance of delivery of materials will exceed the quantities permitted under CMP regulation No. 2.

Allotments will be returned up through the chain; that is, a secondary consumer will return unusable allotments to the consumer from whom he obtained his original allotment and a prime consumer will return unusable allotments to the claimant agency or industry division from whom he received his original allotment. This new procedure and new form supersede form WPB-3029 which was a one-time form used to return allotments directly to the WPB.

The steel warehouse industry is urging officials in Washington to grant them relief in filling certain orders. Until July 1 warehouses were permitted to fill only orders rated AA-5 or higher but now they can honor only authorized

(*Please turn to Page* 157)

WPB Announces Formation of Advisory Committees

War Production Board has announced the formation of the following industry advisory committees:

Molybdenum

Marx Hirsch, Molybdenum Corp. of America; Carl M. Loeb, Climax Molybdenum Co.; C. T. Ulrich, Kennecott Copper Corp.; and R. Van Fleet, U. S. Vanadium Corp.; all of New York.

Power and Distribution Transformer

John H. Darby, president, Erie Electric Co. Inc., Buffalo; A. C. Farmer, assistant to vice president, Westinghouse Electric & Mfg. Co., Sharon, Pa.; Samuel Horelick, president, Pennsylvania Transformer Co., Pittsburgh; H. F. McRell, assistant manager, General Electric Co., Pittsfield, Mass.; J. J. Mullen Jr., executive vice president, Moloney Electric Co., St. Louis; S. W. Stockwell, Davis Transformer Co., Concord, N. H., and A. Marcus, Eisler Engineering Co., Newark, N. J.

Welded Steel Tubing

T. C. Bright, Revere Copper & Brass Inc., Rome, N. Y.; James A. Ireland, Republic Steel Corp., Cleveland; Arthur E. Jones, Metal Forming Corp., Elkhart, Ind.; R. D. Malm, Clayton Mark & Co., Evanston, Ill.; C. E. Miller, Michigan Steel Tube Products Co., Detroit; and A. K. Smalley, Carpenter Steel Co., Roselle, N. J.

Vacuum Closure

L. T. Crabbe, Phoenix Metal Cap Co., Chicago; E. C. Emanuel, Armstrong Cork Co., Lancaster, Pa.; G. L. McClain, Aluminum Seal Co., New Kensington, Pa.; Charles Raney, Anchor Hocking Glass Corp., Lancaster, O.; Earl F. Turner, Hazel-Atlas Glass Co., Wheeling, W. Va.; A. H. Warth, Crown Cork & Seal Co., Baltimore; J. M. Wheaton, Owens-Illinois Glass Co., Toledo, O., and Phil White, White Cap Co., Chicago.

Contractors Construction Machinery

E. A. Daylor, E. A. Daylor Co., Contesville, Pa.; Morris E. De Witt, Porter-DeWitt Construction Co., Kirkwood, Mo.; U. Rutledge Hill, Clifford Hill & Co. Inc., Dallas, Tex.; J. J. McLaughlin, Great Falls, Mont.; Wade E. Moore, Forcum James Co., Dyersburg, Tenn.; Joseph R. Perini, B. Perini Sons Inc., Framingham, Mass.; James J. Skelly, James J. Skelly Co., Media, Pa.; C. W. Smith, Smith Engineering & Construction Co., Pensacola, Fla.; D. W. Winkleman, D. W. Winkleman Co., Syracuse, N. Y.; Carl E. Nelson, Logan, Utah, and F. W. Parrott, C. F. Lytle Co., Sioux City, Iowa.

Bakery Machinery Manufacturers

C. D. Ackerman, Peerless Bread Machinery Co., Sidney, O.; A. M. Bornhofen, sales manager, Anetsberger Bros., Chicago; Claud Bryson, Baker Perkins Co., New York; W. Clark Dean, Union Steel Products Co., Albion, Mich.; T. F. Freed, Read Machinery Co. Inc., York, Pa.; Fred D. Pfening, Fred D. Pfening Co., Columbus, O.; D. W. Smith, president, Colborne Mfg. Co., Chicago; A. W. Gellman, Gellman Mfg. Co., Rock Island, Ill.; C. A. Ginter, Oliver Machinery Co., Grand Rapids, Mich.; Gay Larsen, general manager, Middleby-Marshall Oven Co., Chicago; E. J. Lauterbur, Hobart Mfg. Co., Troy, O.; Martin Miller, American Machine & Foundry Co., New York; C. L. Russell, American Bakers Machinery Co., St. Louis Mo.; Lee B. Thomas, Katzinger Pan Co., Chicago; and Thomas S. Vierow, Kotten Machine Co., Brooklyn, N. Y.

Aluminum Foundry

Government presiding officer is Frederick Ayer II. Committee members are: C. J. Amick, vice president, Century Metalcraft Corp., Los Angeles; C. A. Brantingham, president, Ebaloy Foundries Inc., Rockford, Ill.; Bruce W. Burroughs, executive vice president, National Bronze & Aluminum Foundry Co., Cleveland; E. G. Fahlman, president, Permold Co., Medina, O.; Grant Fink, Servel Inc., Evansville, Ind.; Frank Gaines, vice president, So-Cal Foundry, Los Angeles; H. G. Lamker, superintendent of foundries, Wright Aeronautical Corp., Pater-

(*Please turn to Page* 158)

PRIORITIES–ALLOCATIONS–PRICES

Weekly summaries of orders and regulations, together with official interpretations and directives, issued by War Production Board and Office of Price Administration

INSTRUCTIONS

PRODUCTION SCHEDULES: Manufacturers of class A civilian type end products, who have received allotments and authorized production schedules from various claimant agencies and from a WPB industry division, and who discover that because of labor shortage, lack of capacity, delays in material deliveries or other causes they will be unable to meet all authorized production schedules, should report the matter to the appropriate WPB industry division so that it may furnish directions. Class A civilian type end products are specified items which are purchased by claimant agencies directly from the manufacturer.

SUSPENDED ORDERS: When a customer suspends an order or an item of an order which a steel producer previously has accepted, the order or item loses its status as an accepted order and must be removed from the producer's schedule. If a suspended order is released at a later date, it must be treated as a new order received on that date. If the new delivery date is in the same quarter for which it originally was scheduled, the customer must confirm his prior certification that he is authorized to use the allotment number on the order. If the new delivery date specified is in a later quarter, the customer must furnish an appropriate allotment and confirm his prior certification.

TARDY ALLOTMENTS: Reports on form CMP-26 received by the Steel Division during July indicate that some producers accepted second quarter allotments after June 30. Steel producers have been reminded that an allotment is valid only in the quarter for which it has been issued. It cannot be used for placing authorized controlled material orders in any other quarter. Therefore, steel producers should not accept an allotment after the last day of the quarter for which it was issued irrespective of the fact the material required was produced in a previous quarter.

L ORDERS

BEDS, BED SPRINGS: Permission to use rail steel angles and bessemer or low-carbon steel for frames and borders in manufacture of coil, flat and fabric bed springs has been granted. Manufacturers' quota allowances of iron and steel for bed spring production during the three months beginning July 1, 1943, have been increased from 3⅛ per cent to 10 per cent of the amount used by each manufacturer in his aggregate production of coil, flat and fabric bed springs (which were not integral parts of beds or other sleeping equipment) during the base year ended June 30, 1941. (L-49)

REPLACEMENT BATTERIES: Permits any manufacturer of replacement batteries, except those located in Niagara Falls, N. Y., Los Angeles, San Francisco, Seattle, and Portland, Oreg., to increase their production up to 5 per cent over 1941 sales, provided their total sales for that year were over 25 000 units. For smaller manufacturers whose sales for 1941 did not reach the 25 000 unit total, authorization is extended to build up to that quantity for the year 1943. (L-180)

NE STEEL PRODUCTS: Standard specifications for various types of steel pipe are embodied in schedules 11, 12, and 13 to order L-211. Schedule 11 provides specifications and standard sizes for steel pressure pipe commonly used in power plants and certain industrial plants. They cover both carbon and alloy steel piping in buttwelded, seamless, electric resistance welded, and fusion welded grades.

Schedule 12, covering steel pressure tubes, includes boiler, cracking still, heat exchanger, condenser, and superheater tubes.

Schedule 13 sets up specifications for steel pipe, exclusive of pipe covered by other schedules, and certain specialty items such as corrugated pipe, dredge pipe, etc. (L-211)

HARDWARE: Specifies in a new schedule (II) permitted sizes, types and grades of marine joiner hardware; materials that may be used in its manufacture, effective Sept. 27. Ferrous metals and plastics are required as substitutes for brass or bronze wherever practicable, and brass and bronze when used must be mainly secondary metal. Permits use of brass or bronze for certain purposes on board ship where ferrous metals would not be suitable due to magnetic disturbances and the corrosive action of salt water spray. Manufacturers must report by Sept. 17 on WPB-1902 (formerly PD-754) to WPB the catalog number, size and style of each type of lock or latch he is manufacturing. Exempted from the provisions of schedule II are repair parts; hardware manufactured from parts in possession of the producer on or before Aug. 28; and hardware manufactured to fill contracts with the Army, Navy, Maritime Commission, or War Shipping Administration executed before Aug. 28. (L-236)

INDEX OF ORDER REVISIONS

Subject	Designation
Batteries, Replacement	L-180
Beds, Bed Springs	L-49
Hardware	L-236
Machinery and Equipment:	
Farm	L-257, L-257-a
Logging, Wood Products	L-311
NE Steel Products	L-211
Petroleum Industry Materials	P-98-c
Printing Plates	M-99, M-339
Price Regulations	
Castings, Iron Malleable	No. 341
Pig Iron	No. 10
Pipe, Reusable Iron and Steel	No. 230

FARM MACHINERY AND EQUIPMENT: Basic order governing production of farm machinery and equipment has been extended for an indefinite period. It was due to expire June 30, 1944, but now will be amended periodically as requirements arise. Schedules for future quota periods will be issued several months before the start of each annual period opening July 1. Until new quota schedules are issued each producer is expected to plan production on current applicable schedules which are designated as "A" and cover the period July 1, 1943, to June 30, 1944. Unless a new schedule is announced in the meantime, schedule A may also be considered as applicable for the period beginning July 1, 1944. Several additional countries have been added to schedule X-9 of order L-257-a, at the request of the Office of Foreign Relief and Rehabilitation, in order that special quotas can be assigned if necessary. (L-257, L-257-a)

LOGGING, LUMBER AND WOOD PRODUCTS MACHINERY AND EQUIPMENT: A new order (L-311) covers control over distribution and manufacture of logging, lumber and wood products machinery and equipment, including following types: dry kilns and redriers, machinery for logging, saw and planing mills, veneer and plywood products, wood containers, and general woodworking machinery and equipment. Restricts purchase orders for machinery having a producer's list price of over $350 on Oct. 15, 1942, (designated as class I) to those authorized by WPB. Application for authorization and preference rating is made by the purchaser on form WPB-3131. Exempted from the authorization provision are purchase orders which are: (1) For machinery to be used directly by the Army, Navy, Maritime Commission or War Shipping Administration; (2) placed by a producer or dealer to fill authorized orders actually received, or to replace machinery delivered from inventory to fill authorized orders, or (3) included in preference ratings assigned under authorization to begin construction work (form WPB-617, formerly PD-200). Purchase orders for machinery valued at $350 or less, by a producer's list price on Oct. 15, 1942, (designated as class II) are restricted to those with preference ratings of AA-5 or higher. Dealers' inventories of class II machinery are limited to five of any one size or type irrespective of manufacturing make. Further control over class II machinery is provided by limiting manufacture in any one month to 50 per cent by dollar value of the combined amount shipped by a producer during the second and third preceding months. This limit, however, may be exceeded to permit filling specific orders with AA-5 or higher rating, actually received by a producer.

All producers must file monthly operations reports on form WPB-3130 on or before the 10th of each month, beginning with October. Restrictions on purchase orders are effective Sept. 11. (L-311)

M ORDERS

PRINTING PLATES: Restrictions on use of copper and zinc in printing plates have been combined in a single order, M-339, which also includes certain new provisions. These operations formerly were governed by orders M-99 and M-9-c. Restricts use of zinc to 50 per cent by weight of a person's 1941 quarterly usage; of copper to 60 per cent of a person's 1940 quarterly usage. A new provision permits the borrowing of 15 per cent against the next quarter's quota, and also allows use of any unused quota from the previous quarter. Copper and zinc used in plates ordered by any department or agency of the government are exempted from the quota established by the new order. Also exempted are copper and zinc used in plates which are made exclusively for printed matter which is ordered directly from the producer of the printed matter by any department or agency of the government, but only when the person who orders the plates is both the person in whose name the government order is placed and the person who actually produces the printed matter. Purchase orders for plates which are properly exempted under this provision must carry the certification called for in the order.

The order provides that for each four pounds of 16-gage photo-engravers' sheet copper (which were in finished form before July 1, 1943, and which now are in the possession of photo-engravers and suppliers) which a photo-engraver uses, he may charge only three pounds against his allowable usage. There is no similar provision for the partial ex-quota use of 16-gage zinc.

Electrotypers will be permitted 50 per cent of their allowable usage of copper in the form of virgin anodes beginning with the fourth quarter of 1943, instead of 25 per cent in this form and 75 per cent in the form of scrap. No increase in the over-all allowable usage of 60 per cent of a person's 1940 quarterly usage is permitted except that a 10 per cent bonus is allowed when 95 per cent or more of a person's allowable usage is in the form of scrap. Delivery, acceptance and use of copper scrap remain subject to the controls of (M-9-b, M-99, M-339)

P ORDERS

PETROLEUM INDUSTRY MATERIALS: Both used and new equipment in the petroleum industry now may be sold by one operator to a supplier as intermediary prior to its resale to another petroleum operator, without a

direct resale being involved. Suppliers may now also purchase and accumulate odd and end lots of new and used oil country tubular goods from various operators and re-sell complete strings to other operators. Neither preference ratings nor controlled materials allotment numbers may be used or are required in purchasing or re-selling either used or new materials acquired from petroleum operators.

However, new controlled materials acquired by suppliers from mills or equipment distributors under order M-21-b-2 or field stocks of oil country tubular goods which are now being established under WPB directives may be sold on the basis of allotment numbers. Newly-established field stocks of tubular goods require special allotment numbers in addition and may not be sold until these special allotment numbers including the symbol "FS" are obtained. (P-98-c)

PRICE REGULATIONS

PIG IRON: An increase to $34 from $28 per gross ton, f.o.b. furnace, in the maximum price of Lake Superior charcoal pig iron, retroactive to July 1 has been authorized by OPA. (No. 10)

REUSABLE IRON AND STEEL PIPE: Specific maximum prices, effective Sept. 4, for joint welding reusable iron and steel pipe have been established at 11 cents per lineal inch of circumference for standard weight pipe and heavier and 10 cents per lineal inch of circumference for lighter than standard weight pipe. Maximum for prime coating reusable iron and steel pipe is established at $7.50 per net ton of weight of pipe after prime coating but may be charged only when the service is performed at request of the buyer for preservative purposes. A maximum price of 70 per cent of the mill carload delivered price at the shipping point is established for light weight spiral weld pipe and all reusable iron and steel pipe of an outside diameter larger than 26 inches. (No. 230)

MALLEABLE IRON CASTINGS: Sellers of malleable iron castings now may add, effective Sept. 4, overtime costs in computing their maximum prices when using the "formula" or "pre-base period" pricing methods provided in price regulation No. 341. Under the "base period" method, maximum prices are the highest at which the producer contracted to sell between Oct. 1 and Oct. 15, 1941. This method does not permit the adding of overtime costs to "base period" maximum prices.

Under the "formula" method, the seller must use his pricing method in effect for him on Oct. 15, 1941, employing the same rates, bases and customary mark-up used by him on that date, except that he may compute overhead rates on the bases of his experience in the foundry during the period from Jan. 1 to June 30, 1942.

Under the "pre-base period" method, the seller's maximum price is established as the actual price at which he last sold a similar casting prior to Oct. 1, 1941. Method by which overtime costs may be added in computing "pre-base period" and "formula" maximum prices is divided into four steps: (1) Seller selects whether he shall compute overtime on a monthly or quarterly basis; (2) computes the overtime premium per dollar of sales of malleable iron castings for the month or quarter, as the case may be, which precedes the period in which the casting in question is priced; (3) reduces this overtime premium per dollar of sales by the percentage by which average hourly earnings during the preceding period exceeds average hourly earnings in his plant in the payroll period immediately preceding Oct. 15, 1941; (4) applies the resultant rate in (3) to the maximum price of the casting which would otherwise be arrived at without the inclusion of any overtime. (No. 341)

Appointments - Resignations

James A. Folger has been appointed regional director of the WPB regional office, San Francisco, to succeed Harry H. Fair.

Manufacture May Be Increased by Using Excess or Frozen Steel Stocks

Reserve of 400,000 tons in various shapes and forms held by Steel Recovery Corp. should be drawn upon by manufacturers of permitted civilian products whose production is governed by tonnage received through CMP allotments

BY USING excess or frozen steel stocks obtainable through the Steel Recovery Corp., manufacturers of certain permitted civilian products may possibly increase output of these items, it was pointed out last week by the Consumer Durable Goods Division, War Production Board.

This is true particularly of manufacturers whose production is governed by the amount of steel received through CMP allotments.

The corporation at present has available about 400,000 tons of such steel in a variety of shapes and forms.

Cautioning that this does not mean any relaxation of present restrictions on manufacture of consumer goods, officials of the division said that consumption of the steel stocks must conform to existing WPB limitation orders and other regulations.

It was pointed out that oftentimes CMP allotments of steel to manufacturers of civilian goods are not large enough to permit attainment of the permitted production level of those goods. In such cases, officials said, use of excess or frozen steel stocks listed with the Steel Recovery Corp. would permit increased production of the consumer item involved without violations of any exisiting WPB regulation.

Excess or frozen steel stocks listed with the recovery corporation can be used over and above the CMP allotment made to the individual manufacturer. As long as he does not violate WPB limitation orders, the manufacturer does not have to deduct such steel from his CMP allotment, officials said.

Manufacturers must also conform to their authorized production schedules when these are issued to them by WPB. However, when the schedules are based on the allotment of controlled materials plus the material withdrawn from inventory, output may be increased to the extent permitted by the use of excess or frozen steel stocks.

Sales of excess or frozen steel stocks reported to Steel Recovery Corp. must be authorized on form WPB-2757 in accordance with provisions of priorities regulation No. 13, which controls sale of excess or frozen industrial material. Inquiries should be directed to any WPB regional office or to the Steel Recovery Corp., Pittsburgh.

Manufacturers should state the class, grade, size (and whether there are acceptable substitutes as to size), heat treatment or steel required and proposed use.

WPB Clarifies NE Steel Limitation Order L-211

Conditions under which customer specifications may be used in the purchase of products covered by the various schedules of order L-211 have been set forth by the War Production Board in interpretation No. 1 to the order. Order L-211 requires producers to manufacture various steel products to certain designated specifications and prohibits the acceptance of such products which the customer has reason to believe were produced in violation thereof.

A producer may accept an order to a customer's private specifications for any steel product for which a specification is prescribed by a schedule to order L-211 provided:

"(1) That such customer specification is in agreement with a definite specification designated in the schedule, and provided the purchaser so states in placing his order, or

"(2) That such customer specification specifies only such requirements as the customer is authorized to specify in the schedule, or such directions as are necessary to the contract, which do not violate the provisions of the schedules.

"No other customer specification for such products may be accepted except on authorization on appeal in accordance with limitation order L-211."

Labor Shortage Curtails Die-Head, Chaser Output

Production of die-heads, chasers and collapsible taps is still critical, War Production Board was advised last week by industry representatives. Production is retarded by the difficulty of retaining skilled workmen due to enlistments and shifts to other jobs. Inexperienced labor is causing an increase in output of damaged pieces.

Bethlehem Relines Stack in 19 Days

JOHNSTOWN, PA., plant of Bethlehem Steel Co. laid claim to a new all-time record when relining of its No. 6 blast furnace was completed Aug. 28 in 18 days and 20½ hours, about one-third the usual time required.

The stack, built in 1879, has an 18-foot diameter hearth and is 86 feet 9⅝ inches in height. Capacity is 21,000 tons of pig iron a month.

General Manager R. E. Hough is shown at left in upper photo shaking hands with E. W. Trexler, superintendent of mechanical department, as he congratulated the men on their accomplishment. Others in photo, left to right: Robert Rodgers, assistant superintendent of mechanical department; William Reese, foreman of brick masons; Ralph McCleester, general foreman of construction; Frank Heeney, assistant to superintendent of mechanical department; Ted Fairchild, general foreman of bricklayers; H. M. Crossett, assistant general manager; George Rodgers, assistant superintendent of mechanical department; and Gordon Baer, superintendent of blast furnaces.

Center photo shows workmen swinging in a load of brick during the relining.

Lower view shows tapping of the salamander.

Whither Surplus War Plants?

United States Chamber of Commerce organizes committee to consider problem of disposing of unneeded factories and supplies

IMMEDIATE and continuing study of the problem of disposing of surplus war plants and supplies is being undertaken by the United States Chamber of Commerce. A special business men's committee to consider the subject has been formed and 27 representatives of varied lines of industry already have accepted President Eric Johnston's invitation to participate in the work. Chairman is Albert C. Mattei, a vice president of the chamber and president of the Honolulu Oil Corp., San Francisco.

First meeting of the group, known as the Special Committee on Utilization of War Plants and Surplus Property, will be held in Washington Sept. 9-10. At that time, a preliminary survey of the scope and extent of the problem will be made. An invitation has been extended to business men to bring to the attention of the committee phases of the problem that are of particular concern to them. Communications should be addressed to T. W. Howard, manager of the chamber's department of manufacture, who is secretary of the committee.

In a statement outlining the committee's purposes, the chamber said:

"Even before military operations reach their greatest intensity, the war agencies are finding that they have excess stocks of some kinds of war material and supplies. The accumulation of such stocks is inevitable in a highly mechanized war. New weapons, redesigned facilities and necessary changes in the fighting man's equipment make obsolete munitions and supplies previously in use.

"As the war goes on and comes to a close, the problem of the disposition of surplus property will become increasingly important.

"There will be the problem, at the end of the war, of the proper and efficient utilization of the great special-purpose manufacturing plants.

"Looking ahead at the immensity of these problems and in the recognition that they will affect nearly every field of business, the national chamber has set up a strong committee which will undertake immediately, preliminary consideration of the entire subject and devote itself continuously to specific problems as they arise."

WHEN PEACE COMES

New processes and new products now being planned by industry for the postwar era are described in "Testimony to the Future," a booklet just published by the National Association of Manufacturers.

Covering a wide range from plastic thread window screens to mass produced railroad car wheels of metals more resistant to heat caused by brake shoes, the report warns the public not to expect radical changes in consumer products immediately. Manufacturers will first attempt to get peacetime industry under way rapidly and this best can be done by making models perfected before the war, with minor improvements.

Texas Foundry Group Plans Oct. 29 Meeting

First meeting of the newly organized Texas foundry group is scheduled at Houston, Tex., Oct. 29, according to the organization committee headed by F. M. Wittlinger. Guest speaker will be R. G. McElwee, chairman, cupola research project, American Foundrymen's Association.

Arrangements are being made to have a second meeting a day or two later at either Dallas or Fort Worth.

WPB Proposes Using War Prisoners in Ore Mines

War Production Board's iron ore executives reportedly have suggested use of war prisoners in eastern mines to alleviate the critical labor shortage in Eastern iron ore mines.

No labor shortage in western mines has been reported. Another proposal is the use of war prisoners on railroads, thus releasing railroad workers for work in the mines. No action has been taken yet.

They Say:

"Absolute victory in this war will give greater opportunities to the world because the winning of the war in itself is proving that concerted action can accomplish things."—**President Roosevelt.**

* * *

"The enlightened business management of this nation must and will adapt itself to this emotional age in which people are thinking constantly of human rights. There is but one difference between management and labor, and that is that management has the responsibility for perpetuating the business and therefore must make decisions which affect the life of the business."—**Frederick C. Crawford,** president, National Association of Manufacturers.

* * *

"To win the peace, to insure perpetuation of our American institutions, high levels of employment and productivity must be achieved as quickly as may be possible in the early postwar period. That objective can be reached only by immediate bold, effective planning on the part of the employers of America."—**Louis Ruthenburg,** president, Servel Inc., Evansville, Ind.

"Adoption of a joint master plan by the government, labor, and industry, which would provide for a more definite and specific disposition of manpower, improvement of personnel placement methods, and planning a postwar industrial policy which would give war workers some promise that they will not be left jobless, is necessary if we want our plants to be manned effectively."—Professor **Walter Rauthenstrauch,** director, industrial engineering department, Columbia University.

* * *

"It must be borne in mind constantly that realization of our hopes for steady employment and prosperity in postwar America is dependent upon an economic climate in which research and industrial expansion can attain maximum growth. There must be a revision in tax policies which are preventing industry from accumulating adequate reserves for reconversion and increased peacetime production facilities. New investment capital must be encouraged into industry if we are to enjoy the full harvest of our ingenuity and productive capacity."—**Dr. A. R. Olpin,** director, Research Foundation, Ohio State University.

MEN of INDUSTRY

T. H. McSHEEHY

FRANK SHUGERT

J. C. VIGNOS

P. S. JONES

T. H. McSheehy has been appointed sales manager, Wire Rope division, Wickwire Spencer Steel Co., New York. **J. A. Old** succeeds Mr. McSheehy as Pacific Coast sales manager.

—o—

Frank Shugert, formerly industrial relations director, Ranger Aircraft Engine division, Fairchild Aircraft Corp., Jamaica, N. Y., has been appointed director of industrial relations, Elastic Stop Nut Corp., Union, N. J.

—o—

G. H. Sheldon, vice president in charge of production, Upson-Walton Co., Cleveland, has been elected a member of the board of directors.

—o—

Malcolm G. Kirk, former manager, priorities section, Pittsburgh Screw & Bolt Corp., Pittsburgh, has been appointed manager of the company's American Equipment division, Norristown, Pa., succeeding the late John A. Longacre.

—o—

Carl F. Freedman, general manager, American Agile Corp., Cleveland, has been named a vice president.

—o—

Lawrence D. Bell, president, Bell Aircraft Corp., Buffalo, has been elected president of the Aircraft War Production Council, East Coast, Inc., succeeding **J. Carlton Ward Jr.,** president, Fairchild Engine & Airplane Corp., New York. **L. C. Goad,** vice president, General Motors Corp., Detroit, has been elected vice president of the council. The term of both offices is four months.

—o—

John C. Sykora, sales manager for the past 14 years, Commercial division, Gould Storage Battery Corp., Depew, N. Y., has been elected vice president.

—o—

Bryan C. S. Elliott, chief of the bureau of taxes for Carnegie-Illinois Steel Corp., Pittsburgh, since 1941, has been appointed supervisor, tax division. Mr. Elliott is a member of the American Institute of Accounting.

—o—

J. C. Vignos, formerly assistant executive vice president, Ohio Ferro Alloys Corp., Canton, O., has been named general sales manager. Mr. Vignos succeeds **H. A. Landon,** who has become Pacific Coast representative for the company.

—o—

I. Frank Brownson, regional co-ordinator, Appliance division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed manager of the division's laundry equipment department.

—o—

Hal M. Stone has been appointed assistant manager, coal department, Cleveland-Cliffs Iron Co., Cleveland.

—o—

Harry T. Worthington, formerly sales and production executive, Manning, Maxwell & Moore, New York, has joined Beardsley & Piper Co., Chicago, as general manager.

—o—

Lowell E. White, former test pilot for Wright Aeronautical Corp., Paterson, N. J., has joined the research engineering staff of C-O-Two Fire Equipment Co., Newark, N. J.

—o—

Louis F. Holtzman has joined the public relations staff of Consolidated Vultee Aircraft Corp., San Diego, Calif.

—o—

L. E. Hammer has joined Worthington Pump & Machinery Corp. as assistant works manager of the Moore Steam Turbine division, Wellsville, N. Y.

—o—

F. L. Magee has been appointed to the new post of general production manager and assistant to vice president, **I. W. Wilson,** Aluminum Co. of America, Pittsburgh. **Donovan Wilmot** has been named product manager for sheet, succeeding Mr. Magee and he in turn is succeeded as product manager for ingot by **Ralph V. Davies. Edward B. Wilber,** Washington office manager since 1935, has been transferred to head of the New York office, and **Arthur P. Hall** takes his place as Washington manager.

—o—

P. S. Jones, former manager, New York sales territory, Cutler-Hammer Inc., Milwaukee, has been appointed general sales manager for the company's thirty selling territories throughout the country.

—o—

Arch H. Copeland and **John Berdan** have been appointed assistant sales directors, Diamond Alkali Co., Pittsburgh, and **J. D. Mattern** has been named manager of alkali sales.

—o—

William J. Conley, former faculty member of Rochester University, has joined Lincoln Electric Co., Cleveland, as consulting engineer.

—o—

R. S. Arnold, superintendent, Ideal Foundry Co., Newton Falls, O., subsidiary of Republic Steel Corp., Cleveland, has resigned.

—o—

W. H. Richardson, former assistant general sales manager, Timken Roller Bearing Co., Canton, O., has been appointed general manager of all activities for Timken on the West Coast and in the Orient, with headquarters in San Francisco.

—o—

Clayborn L. Jackson, editor of *Acme News,* house organ of Acme Steel Co., Chicago, has been elected president of the American Association of Industrial Editors, Ottumwa, Iowa. Other officers elected were: First vice president, **Clint McKnight,** Diamond Alkali Co., Painesville, O.; second vice president, **Ralph Lewis,** Caterpillar Tractor Co., Peoria, Ill.; third vice president, **Maxey Morrison,** Curtiss Wright Corp., Caldwell, N. J.;

RUBERT J. LINDQUIST

secretary, **Jane Lavin**, International Resistance Co., Philadelphia; treasurer, **H. E. Hornberger**, Gulf States Paper Co., Tuscaloosa, Ala.

—o—

Rubert J. Lindquist, since 1941 vice president and director, Reynolds Metals Co., Richmond, Va., has joined Curtiss-Wright Corp., New York, and has been elected vice president in charge of finance. Prior to his association with Reynolds, Mr. Lindquist held the position of chief auditor, Reconstruction Finance Corp., from 1932 to 1941.

—o—

Herbert Davis, former assistant superintendent in charge of the seamless hot mills, Youngstown Sheet & Tube Co., Youngstown, O., has joined Hi-Alloy Castings Co., New Brighton, Pa., as metallurgist.

—o—

Philip B. Stull, former general manager, paper makers chemical department, Hercules Powder Co., Wilmington, Del., has been elected vice president, and is succeeded as manager of the PMC department by **Ralph B. McKinney**. Mr. Stull became associated with Hercules in 1926 when the Virginia Cellulose Co. of Hopewell, Va., of which he was president, was acquired by them. In 1933 he was elected a director of Hercules.

—o—

W. B. Rose has joined Pemco Co., Baltimore, as advertising manager. Previously, Mr. Rose had been in the national advertising department of the *Philadelphia Evening Ledger*. **O. L. Davis** has been appointed purchasing agent for Pemco. Mr. Davis' wide experience includes association with Western Electric Co., New York, Acme Steel Co., Chicago, and Brainard Steel Corp., Warren, O.

—o—

Delos M. Palmer, former dean of engineering, University of Toledo, has been appointed plant engineer, American Propeller Corp., Toledo, O.

—o—

Robert R. Rhodehamel, former head of the planning department, National Acme Co., Cleveland, has been named general sales manager.

—o—

William C. Cuntz has been appointed Pittsburgh district manager, Welding division, Metal & Thermit Corp., New York. The territory under Mr. Cuntz's supervision is comprised of southern New Jersey, Pennsylvania, Ohio and all of the Southeastern states, including Kentucky, Tennessee and Alabama. **James M. Wilson** has been named district engineer at Pittsburgh, and **Louis G. Vock** has been appointed a Chicago district engineer.

—o—

Charles G. Berwind, vice president and director, Berwind-White Coal Mining Co., Philadelphia, has been elected director of Pennsylvania Salt Mfg. Co., Philadelphia.

—o—

PAUL DIETZ

Who has been appointed export sales manager, General Machinery division, Allis-Chalmers Mfg. Co., Milwaukee, noted in STEEL, Aug. 30, p. 54.

FRED F. MURRAY

Who has been elected president, Oil Well Supply Co., Dallas, Tex., subsidiary of United States Steel Corp., as reported in STEEL, Aug. 30, p. 55.

OBITUARIES . . .

Shurly Christy Hodge, 61, president and treasurer, Taylor-Shantz Co. Inc., Rochester, N. Y., died there Aug. 28.

—o—

William A. MacKenzie, 73, director, Crucible Steel Co. of America, Milwaukee, died Aug. 29 in Syracuse, N. Y. Mr. MacKenzie also was a director of the New Process Gear Co., Syracuse, and the Toledo Shipbuilding Co. Inc., Toledo, O.

—o—

Mortimer C. Rosenfeld, 67, founder and former president, Grabler Mfg. Co., Cleveland, died Aug. 27 in that city.

—o—

Alexander Laughlin, 77, founder and president, Alexander Laughlin & Co., Pittsburgh, and one of that city's leading industrialists for half a century, died there Aug. 30.

—o—

Fay H. Rosencrants, 54, vice president, Combustion Engineering Co. Inc., New York, and an authority on steam-power plants and boiler design, died Aug. 26 in Scarsdale, N. Y.

—o—

J. H. Schroeder, 58, traffic manager since 1938, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., died there Aug. 24.

—o—

Guy Hinchman Noble, 66, retired engineer, Structural Gypsum Co., New York, died in Plainfield, N. J., Aug. 29.

—o—

George W. Crist, 57, sales engineer in Detroit for Cleveland Graphite Bronze Co., Cleveland, died in Detroit Aug. 27.

—o—

William D. Thomas, 55, president, W. D. Thomas Co., New York, died recently in Hewlitt, N. Y. Mr. Thomas at one time had been president of Sandvik Steel Co., New York, and also had been associated with the Stanley Steel Works, Bridgeport, Conn.

—o—

Charles T. Dabney, midwestern district representative, Briggs Clarifier Co., Washington, died Aug. 25 in Toledo, O., while attending a business conference.

—o—

Gordon A. Webb, 50, district sales representative in Detroit for Pressed Steel Co., Wilkes-Barre, Pa., and Ohio Steel Foundry Co., Springfield, O., died in Detroit, Aug. 28. An active member of the American Society for Metals, Mr. Webb was well known throughout the metalworking and metal treating industries.

Dare We Speak of Peace?

Yes—because it means so much to all of us individually. With it will come again those products of industry like the car, the radio and the refrigerator, which never were luxuries so much as necessities. And those who are thinking in post-war terms are asked to remember that Weatherhead will be prepared to help build these products again as well as the many strange new ones destined to emerge from this war.

Look Ahead with

Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND, OHIO
Manufacturers of vital parts for the automotive, aviation, refrigeration and other key industries.

Plants: Cleveland, Columbia City, Ind., Los Angeles
Canada—St. Thomas, Ontario

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Automotive industry plants devoted to mass production of aircraft engines proving fertile field for advanced ideas in machining, grinding, etc. . . . General Motors begins negotiations for changes in union contract

DETROIT

BECAUSE aircraft engines have never until recently been built in mass numbers, and because motor company master mechanics, tool engineers and process men have a thorough understanding of the principles of mass production by virtue of experience, new plants which the motor companies have undertaken to operate for production of these engines have been fertile fields for advanced ideas in machining, grinding, materials handling, etc. Innovations have been many and are still in process of installation.

Chevrolet's plants at Buffalo, Buick's at Melrose Park, Ill., Studebaker's in South Bend, Ft. Wayne and Chicago, Nash's in Kenosha, Ford's in Detroit, Chrysler's in Chicago—all building engines under license from either Pratt & Whitney or Wright Aeronautical—are witnessing the application of the best brains of the metalworking and automotive industries to the mass output of radial aircraft engines. They are doing things differently from what the prime contractors ever thought of, and the results are speaking for themselves in terms of volume of production, man-hours of labor and costs.

Fortunately the licensees are not bound by any restrictions on processing methods, so long as the end part meets inspection limits. If time can be saved by shaving gears instead of grinding them, and distortion in quenching can be avoided, then "shave 'em" is the order. Such complicated machine units as the "Greenlee line" for finishing aluminum cylinder heads, the rectangular Foote-Burt valve hole machines now going in at Buick and Ford, and the numerous types of multiple-spindle machines for machining pistons represent equipment with a distinct automotive flavor, born of the years of experience of automotive engineers in doing a job better and faster with less labor. Essentially they are triumphs of man over metals.

On the other side of the ledger there are many irksome phases of aviation engine building that chafe the automotive companies—too complicated parts design, too much fussiness on surface finishing, too much metal to be removed from rough forgings or castings, etc. But these are unimportant alongside the production achievements which are accomplished facts.

A typical case proves the point, so it may be pertinent to examine it in some detail. At the Chevrolet Buffalo operation, engineers were itching over the slow procedure involved in milling fins on the insides of pistons. Each forged aluminum piston is shaped with interior bosses on opposite sides of the skirt which are milled down to form a series of cooling fins. They were formerly cut on a single-spindle vertical milling machine. A new unit was developed with two spindles which could be moved hydraulically into the cut after the piston was chucked on the machine. The cutters were of high-speed steel, nine of them being keyed to each spindle to form the series of fins. Each cutter cost about $10, so the two tools complete ran about $180. Trouble developed with breakage of the cutters through the sharp corner of the keyway, so the doctors were called in.

Cutting Points Are Tipped

The novel solution finally worked out was to blank the cutter disks from cold-rolled steel stock, then to tip the cutting points with high-speed steel, using a conventional welding torch and a cast high-speed steel welding rod, and finally to grind them sharp. Cutter produced by this method could be supplied for $1.50 each, or $27 for the two complete tools—a saving of $153 per set over the old style, not counting the further savings resulting from the virtual elimination of cutter breakage because of the softer, more ductile backing material.

This leads to consideration of another highly interesting development, the casting of high-speed steel welding rods, and here the trail winds to the Gorham Tool Co. in Detroit, which went through a long program of study, research and experiment before perfection of the process of sand casting 16-inch welding rods of high-speed steel. Key to the success finally achieved is believed to be the inclusion of 1 per cent boron in the metal which contains roughly 6-8 per cent molybdenum, 8 cobalt, 4 chromium, 2 vanadium and 1.15 carbon. Boron is added in the form of ferroboron and is a powerful deoxidizer. It assists in giving the proper fluidity to make the molten metal fill the sand molds in which the small-diameter rods are cast.

Gorham operates its own small foundry, with two Ajax induction melting furnaces of 200-225 pound capacity, sand preparation and reclaiming system, molding benches, shakeout, sandblast, heat treating furnaces, pattern shop and laboratory.

The welding rods are cast in ⅛, 5/32 and ¼-inch diameters, the ⅛-inch size being 13 inches long and the others 16 inches. Molds are gated at one side and metal flows from the gate into a runner

FORGING ALUMINUM: Cogging down a 12-inch square aluminum alloy billet, 9 feet in length, to a 9-inch square section, this 3000-ton press at the aluminum forge division of Chevrolet Motor Division is one of the largest in the business. Reduction in cross section of billet increases tensile strength from 40,000 to 55,000 pounds per square inch. Cogged section will be sliced into "biscuits," and forged into aircraft engine crankcase parts

which feeds the series of parallel horizontal holes extending from it. There are 29 rods cast in the ⅛-inch size, spaced about ¼-inch apart; 28 of the ⅛-inch size and 25 of the ¼-inch. The smallest are made in a 12 x 16-inch flask, the others in a 13 x 18 inch. After being shaken out of the sand the rods are sandblasted and centerless ground, no annealing being required. One of the finished rods may be flexed measurably in the hand without breaking, and when dropped on a hard surface gives a ring characteristic of rolled material.

Consider another case. Finish grinding of pistons at the Chevrolet plant in Buffalo is complicated by the fact that the piston design calls for four different diameters plus a slight taper next to the ring grooves. Variation from maximum to minimum diameter is only 0.010-inch and the operation formerly was carried out by properly orienting the piston against a narrow grinding wheel in successive stages. Now a wheel has been developed which is the same width as the piston skirt and which can be dressed to the exact profile of the skirt. Grinding machines are equipped with dressers which by means of a suitable template check contours of the wheels regularly and keep them within limits.

Favors Incentive Pay Plan

Convinced that the introduction of individual incentive pay plans will increase war production from 10 to 25 per cent without increase of manpower, General Motors has included this proposal in a list of 16 "suggestions" which it presented to union leaders as negotiations for changes in the present contract began last week. The suggestions were the results of an intensive canvass of the corporation's entire supervisory organization, from foremen to general managers, and all of them are aimed at increasing production, improving efficiency, conserving manpower, improving discipline, promoting better relations between employes and management, and eliminating abuses by union committeemen of the privilege granted them to take time off their jobs to handle grievances.

Among the suggestions, many of broad basic import to any company operating under union contract, are the following:

1. Eliminate maintenance of membership provision because it amounts to little more than a closed shop.

2. Require discontinuance of scurrilous attacks and false accusations villifying management in official union papers, handbills and other literature, which undermine morale and retard the war effort.

3. Amend the contract to eliminate the investigation of the same grievance by a number of different committeemen.

4. Amend the contract to provide that all employes must first submit grievances to foremen who shall be given an opportunity to adjust them before such grievances are handled by the union.

5. Reduce by 50 per cent the amount of time available to committeemen. This will still allow ample time for prompt handling of all legitimate grievances.

6. Seniority lists are to be furnished the union not more than twice each year, with changes furnished the union at three-month intervals.

7. Amend the contract to make it clear that merit, ability and capacity on the job and potential for further advancement shall be the determining factors in the transfer and promotion of employes to higher paid jobs on war production, with seniority secondary to the foregoing.

8. Require the union to withdraw its opposition and lend its support to individual piecework or other incentive method of pay when it has been determined by the management that the introduction of such incentive method of pay will increase the production of war materials. Any change in the wage payment plans will be negotiated with the shop committee before being placed in effect.

Incentive pay systems are swinging back into favor as a logical means of boosting production in the face of dwindling manpower. As a general thing they have the tacit support of the WPB through vice chairman C. E. Wilson, although he appears to favor a shop-wide incentive system instead of the individual incentive.

There is an important distinction. Under proposals suggested by Wilson, a given plant would be told that if it could increase its output, say, 20 per cent, a commensurate increase in pay would be given to all employes. Unions would be more apt to grab at such a system than at one which rewards individual merit or capability, but the individual who may have a little extra push on his job suffers thereby at the expense of the entire working force, and the incentive thus could logically be expected to disappear in the sphere of the individual workman.

It is extremely doubtful if the UAW-CIO, led by the cagey Walter P. Reuther in its negotiations with GM, will accede to any individual incentive system. It will be branded as a dastardly trick to sweat more out of workers and enrich the coffers of General Motors. Some time ago, a leading union official, speaking off-the-record, said that, with a few reservations, he was in favor of incentive systems, but that a plant had to grow into them and he did not consider union members in the large corporations like General Motors, Ford or Chrysler as yet "ripe" enough for incentive pay.

NEW TWIST

New twist in labor troubles developed last week at Murray Corp. of America when Local No. 2 of the UAW-CIO decided it would set its own working hours. Originally the plant had been working 8-hour shifts with 30-minute no-pay lunch periods. Then the union decided it would prefer to work a 9-hour shift, including a 15-minute paid lunch period. The management agreed and put the plan into effect, but shortly the union reversed its stand and decided to go back to the original schedule, claiming that workers were being docked because they were tardy returning from lunch.

The management demurred, but last Monday noon several hundred overstayed the 15-minute lunch period, forced their way through plant gates. Later the night shift appeared an hour and a half early, crashed the plant gates and went to their jobs while the day shift left after only 8 hours of work. The plant closed Wednesday for annual inventory period through Labor Day.

War Plants' Safety Records Improve

Deaths caused by accidents in war plants are one to one and a half times lower than in the first World War, according to the 1943 edition of *Accident Facts*, statistical yearbook of the National Safety Council. The increase from 1941 to 1942 has been less than the increase from 1917 to 1918, both years when many new and inexperienced workers were added.

The council's record show that women have an unexpectedly good safety record. Only 350 women died last year as result of occupational injuries, compared with 300 in 1940, prewar year when comparatively few were employed in hazardous jobs.

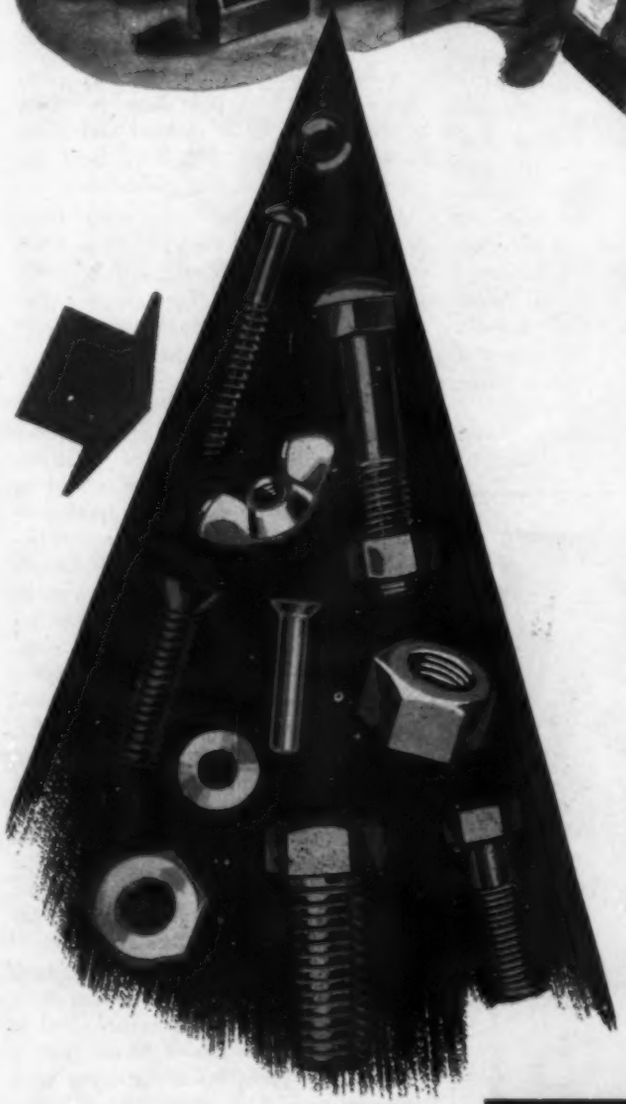
American Steel & Wire Co. Sells Consolidated Works

American Steel & Wire Co., subsidiary, United States Steel Corp., recently sold its Consolidated works in Cleveland to John W. Galbreath, Columbus, O., real estate broker.

Established in 1889 by the Baackes Wire Nail Co., Consolidated Works consists of 12 main buildings in addition to auxiliary structures.

2¢ WOULD HAVE PREVENTED THIS SHUT DOWN

. . . . 2¢ MORE FOR A NON-RUSTING BOLT IN A VITAL PART



CAN A COUPLE OF PENNIES more per bolt save thousands of dollars? Indeed they can . . . and Harper Fastenings are proving it every day. Saving huge sums by preventing hidden destruction by rust and corrosion. They help war production machinery to stand up under today's grueling speed and overtime.

Such tremendous trifles, these Harper non-ferrous and stainless fastenings. Trifling too, in their extra cost. Yet tremendous in their usefulness.

4320 STOCK ITEMS . . . of bolts, nuts, screws, washers, rivets and accessories in the non-ferrous and stainless alloys.

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WING TIPS

Renegotiation after taxes, provision in tax laws for necessary reserves for postwar transition, and changes in present contract termination policies to protect employes suggested for aircraft companies

SURVIVAL of the aircraft industry in some semblance of its present form when the war ends is a matter receiving the serious concern of its leaders. They are fully aware that the present volume of business in no wise can be or will be sustained, but they look out over their three-quarters of a million employes and then at the scant reserves they have been able to set aside for postwar readjustment, and shudder at the thought of trying to keep all or even most of these people busy when military orders dwindle.

Contract renegotiation and excess profits tax laws hit the aircraft industry particularly hard because it has a low tax base in comparison with other established industries by virtue of its low volume of business in prewar years. Furthermore, reserves tentatively set aside for postwar transition are subject to renegotiation, and finally no adequate provisions have been made for gradual termination of war contracts to avoid complete disruption of the industry should the war end suddenly and the Army and Navy thereupon jettison all airplane orders.

It may be argued that the aircraft industry was built to its present magnificence entirely by government funds, or the people's money, both for plants and equipment and for the products, hence, is it entirely fair that the industry's future should be underwritten by such funds? However, this point becomes largely academic when it is realized that one of the first postwar aims of all planners is to maintain full employment. If the airplane companies are forced to liquidate 75 or 80 per cent of their employes at the end of the war, the employment problem would be considerably complicated.

States Industry's Case Clearly

Speaking recently before the House Naval Affairs Committee investigating the defense program, Francis A. Callery, vice president in charge of finance of Consolidated Vultee Aircraft Corp., San Diego, Calif., stated the industry's case clearly and pungently. He spoke not only for his own company, but for Douglas, Lockheed, North American, Northrop and Ryan—all members of the West Coast section of the National Aircraft War Production Council. He urged a three-point program of constructive legislative steps to be taken at once:

1. Base contract renegotiation on net profits *after* taxes, and exempt net profits up to 3 per cent of sales (or whatever rate is determined as reasonable).

2. Provide in the tax law for necessary reserves for postwar transition; and exempt these reserves from renegotiation.

3. Change the present provision for termination of war contracts so as to protect the contractors and in turn the employes now working on tremendously expanded war production.

Certainly it is true that stockholders of aircraft companies are not getting rich out of expanded wartime production. Averaging figures of six leading air-frame manufacturers—Boeing, Consolidated Vultee, Douglas, Lockheed, Martin and North American—the price of common shares of stock in 1939 ranged between $41.70 and $22.81. In 1940 the high was $42.97 and the low $25.72. In 1943, the range so far has been $29.97 high and $21.91 low.

Average dividend of these six companies was $1.06 per share in 1939, $1.96 in 1940, $2.79 in 1941 and down to $1.96 again in 1942. So there has been no skyrocketing of dividends.

Earnings of course have risen, from $1.83 per share in 1939 to $5.00 in 1940, to $9.61 in 1941 and to $12.18 in 1942. But these are more book-keeping figures and show up only in reserves.

Draws Interesting Analogy

Callery drew an interesting analogy of the cost of an airplane to the government from two different suppliers. Assume an identical type of airplane is sold to the government by each of two manufacturers at a price of $150,000, this price being set after all renegotiation adjustments and after allowing each company a profit of 10 per cent before taxes. Further assume one company is an aircraft company which designed, developed and spent its own money on the airplane. This company naturally has a low tax base, arising from low earnings and even losses in prior years, and its profits are taxed at the 80 per cent overall limitation. The second manufacturer, an automobile company perhaps, would be building the plane to the aircraft company's designs and specifications and would be benefiting by the know-how of the aircraft company. This manufacturer, it is assumed, has a favorable tax base, arising from high earnings in former years, and is taxed at an overall rate of 50 per cent.

Now, the profit before taxes for each company would be 10 per cent of $150,000 or $15,000. The aircraft company would pay a tax of 80 per cent, leaving 20 per cent, or $3000 for its net profit. The other manufacturer would pay a tax of 50 per cent of the $15,000 profit, leaving net profit after taxes of $7500.

If the original price is $150,000 and

VERSATILE: George W. Mason, president, Nash-Kelvinator Corp., Detroit, points out to A. M. Wibel, recently elected vice president, how, by altering the pitch of the rotating blades, the Sikorsky helicopter can fly forward, backward, sidewise, or straight up and down

JERRY'S NUMBER COMES UP

ON A STAINLESS CHUTE

When the gunner in a bomber gets a Jerry in his sights, bullets *must* flow freely. Jammed feed lines to a machine gun could make the biggest plane easy prey for enemy fighters.

This is why flexible chuting made of ARMCO Stainless Steel is used for the feeder system. Attached to large ammunition boxes, stainless chuting carries cartridge belts safely and surely to rapid-firing guns. Bullet-filled belts skim over the smooth surfaces without a hitch.

There are other vital reasons for using ARMCO Stainless. This versatile metal is strong and durable; there is little danger that the flexible links will break during combat. It resists the severe abrasion of desert service or the corrosive attack of sea and jungle air. There are no rust particles to gather on cartridges or belts.

How do these advantages of ARMCO Stainless stack up for *your* war-work — or for peace-time products you may be planning. Whether they're on the drawing board or just in the "idea stage" consider using ARMCO Stainless. We'll be glad to work with you. Just write to The American Rolling Mill Company, 2521 Curtis St., Middletown, Ohio.

STAINLESS ARMCO STEEL

THE AMERICAN ROLLING MILL COMPANY

the profit before taxes $15,000, the manufacturer's cost of the airplane would be $135,000. The net cost to the government, however, washing out taxes as in one pocket and out the other, would be the manufacturer's cost plus the net profit to the manufacturer after taxes. In the case of the aircraft manufacturer, this would be $135,000 plus $3000, or $138,000; in the other case $135,000 plus $7500, or $142,500.

Hypothetical Case Interesting

Thus, in this purely hypothetical case, which possibly may be paralleled throughout industry in general, the government would be paying $4500 more for the same product from one manufacturer than from the other, and one company would be making $4500 more profit in wartime for the same service. In substance this has the startling effect of a subsidy to hold up earnings during the war of companies that were profitable before the war!

On the question of anemic reserves, Callery cited some further illuminating figures. Consolidated Vultee sales have expanded from $3,600,000 in 1939, to $9,300,000 in 1940, to $94,800,000 in eleven months of 1941, to $304,000,000 for the year ended Nov. 30, 1942, and to an estimated $350,000,000 for the year ending this November. That is expansion of a neat 18,000 per cent in five years!

Net working capital of Consolidated Vultee after suggested renegotiation settlements, as of Nov. 30, 1942, amounted to approximately $9,000,000, or about 2.25 per cent of sales in 1942 and less than 1.5 per cent of estimated sales for the current year. It is also the equivalent of about two weeks' payroll for C-V.

Last November Consolidated alone had liabilities and commitments of $546,000,000 against which it had cash, receivables and inventories and government supply contracts covering commitments to subcontractors and suppliers. In addition there was the $9,000,000 working capital. If you are a student of corporate finance, figure out the margin of capital to risk and learn why airplane company vice presidents cannot sleep some nights.

If price renegotiation boards adopt a long-range viewpoint and keep in mind the logic of taking every reasonable step now to ease the postwar transition of all industry, they cannot escape the conclusion that the three points mentioned earlier—basing renegotiations on net profits *after* taxes; providing better reserves for the transitional period and exempting these reserves from renegotiation; and lessening the danger of 24-hour contract cancellations—are not only entirely sound but also economically imperative.

PARTIAL DAY'S OUTPUT: Their propellers almost touching the next ship's rudder, basic trainer planes flow tail first down the assembly line at Consolidated Vultee Aircraft Corp., Downey, Calif. The eleven planes shown are only part of one day's production of the line, claimed by the company to be the fastest in the world

Baruch Report Lists Ways To Increase Plane Output

Report covering Bernard M. Baruch's special survey of manpower in the aircraft industry has been submitted to War Mobilization Director James F. Byrnes, according to reliable sources.

The War Department, concerned over the recent sharp drop in plane output, placed its problem before Director Byrnes for emergency action, and the Baruch survey was started Aug. 5.

Although more than twenty recommendations are contained in the report, it is understood they do not include any proposal for immediate adoption of a national service act as a blanket remedy.

One of the recommendations is said to deal with perhaps the most difficult problem confronted by West Coast plants: The differential between aircraft workers' frozen wage rates and the wages offered by shipyards and various other war industries.

From one source it is suggested that the Baruch report may have recommended lifting the wage ceiling for aircraft work to correct this differential and remove what is probably the greatest obstacle to increased aircraft-plant payrolls in that area. However, such a step would be clearly labeled as an emergency measure which was not to be construed as lifting the lid from wages in general.

Changed Aircraft Steel Rules Expedite Delivery

To meet current problems in distributing steel through official aircraft warehouses, the Aircraft Scheduling Unit has effected three new features for expediting deliveries to aircraft contractors:

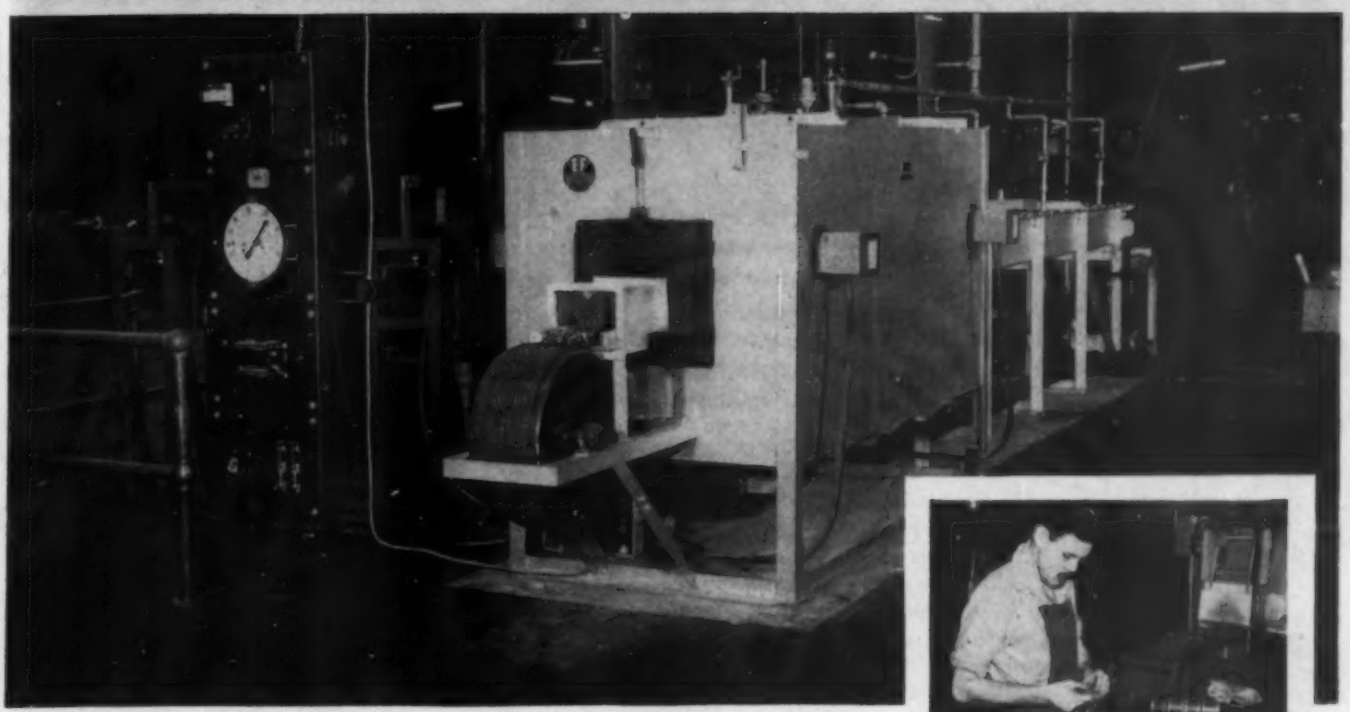
(1) *Back Orders*—Official aircraft steel warehouses are now permitted to accept back orders from aircraft contractors for small quantities of earmarked steel. However, warehouses may not hold the materials in the warehouse to fill these orders. Warehouses are not *required* to accept a back order but they will do so if the item is of standard size normally carried by the warehouse, and if the warehouse believes it will be able to fill the order.

If, at a later date, it appears that

(*Please turn to Page* 159)

EF FURNACES

For Every Industrial Heat Treating Process



The operator assembles the parts and places them on the furnace conveyors.

This EF Copper Brazing Furnace is Making Stronger and Neater Joints 60 to 75% Faster—at 1/4 the Former Cost

"Greatly improved results—neater, stronger joints—60 to 75% faster, at about one quarter the former labor cost," that briefly is the report received from the production manager of a prominent midwestern plant after installing the above EF continuous copper brazing furnace for joining some of their miscellaneous steel assemblies.

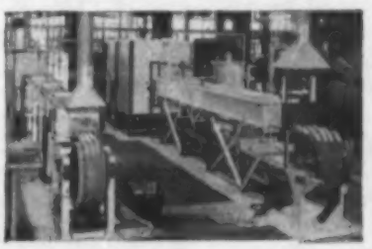
Within a month after their first brazing furnace was installed, a second similar but larger EF furnace was ordered for joining other products—both furnaces are now operating side by side, joining all kinds of assemblies—large and small—neatly, economically and securely.

The assemblies are discharged at the other end... all units securely and neatly joined.

Products difficult or expensive to make in one piece can be made in several pieces and joined—thus not only reducing the cost but actually improving the quality and appearance. Products requiring several stampings joined or requiring screw machine parts, forgings and stampings to complete the unit, can be neatly and economically joined right in the production line in your shop. Strong, leak-proof joints are made and the completed unit is discharged from the furnace—clean and bright.

Any number of joints in the same product or any number of pieces can be joined at one time. The most intricate parts or assemblies are made to actually "grow together," and joints made which are as strong, or even stronger than the original parts. On some parts it is possible to anneal and braze in one operation.

Investigate the brazing process for your products. With slight changes in design you may be able to join your metal assemblies, neater, cheaper and stronger by this method.



Send for printed matter showing various other types of EF copper brazing furnaces.

Investigate the Copper Brazing Process for Joining YOUR Metal Parts

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production

Mathesius Heads Geneva Steel

Named president of newly organized U. S. Steel Subsidiary to operate Geneva works

WALTHER MATHESIUS, vice president in charge of operations of the United States Steel Corp. of Delaware, has been elected president and director of the Geneva Steel Co., the corporation's subsidiary recently organized to operate the $180,000,000 Defense Plant Corp. works at Geneva, Utah.

The Utah facilities, which are scheduled for substantial completion by the end of the year, were ordered by the government primarily to provide steel for West Coast shipbuilding. The Geneva Works was designed by corporation engineers and erected for DPC by Columbia Steel Co., U. S. Steel's Pacific Coast producing subsidiary.

No construction fee was paid nor will any operating fees be paid by the government to the corporation, which will receive reimbursement only for its out-of-pocket expense.

Geneva Works is an integrated plant with raw materials facilities, coke ovens, blast furnaces, steelmaking and finishing equipment. Capacity will be 1,200,000 tons of ingots, 700,000 tons of plates and 250,000 tons of structural steel annually.

Despite delay in obtaining materials due to lack of sufficiently high priorities and difficulty in obtaining labor, the plant is now nearing completion on a 1600-acre site which less than two years ago was an agricultural district.

Mr. Mathesius, who will build the organization of the new company, has been with U. S. Steel since 1911. He served as general superintendent of Carnegie-Illinois Steel Corp.'s South Chicago Works, and in 1935 was made manager of operations of the Chicago district.

Other officers elected, all of whom will serve on the board of directors, are: J. R. Gregory, vice president, sales; J. E. Butler, controller; J. Wohlend, treasurer; and Merrill Russell, secretary and general attorney.

Mr. Gregory, associated with U. S. Steel for 25 years, has been vice president and general manager of sales for Columbia Steel Co.

Both Mr. Butler and Mr. Wohlend have been associated with Columbia Steel for a number of years. Recently, Mr. Butler has been in charge of accounting for the construction of the Geneva Works. Mr. Wohlend formerly was assistant treasurer of Columbia.

Mr. Russell has been a member of Knapp, Cushing, Hershberger & Stevenson, corporation's Chicago counsel.

WALTHER MATHESIUS

Industry Expansion Still Mounts in Chicago Area

Capital invested in new industries and expansions in the Chicago area during August was $16,742,000, sending the total invested in new factories for the first eight months of 1943 to $127,071,937.

With the inclusion of the investments made in industrial plants during the past month, according to statistics prepared by the industrial department, Chicago Association of Commerce, the grand total plant development and expansion program for the war effort, since July, 1940, has climbed to $945,726,937.

DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate);

Cutter Laboratories Inc., Berkeley, Calif., for plant facilities in California, $600,000.

Indianapolis Wirebound Box Co., Indianapolis, $50,000 for equipment at a plant in Texas.

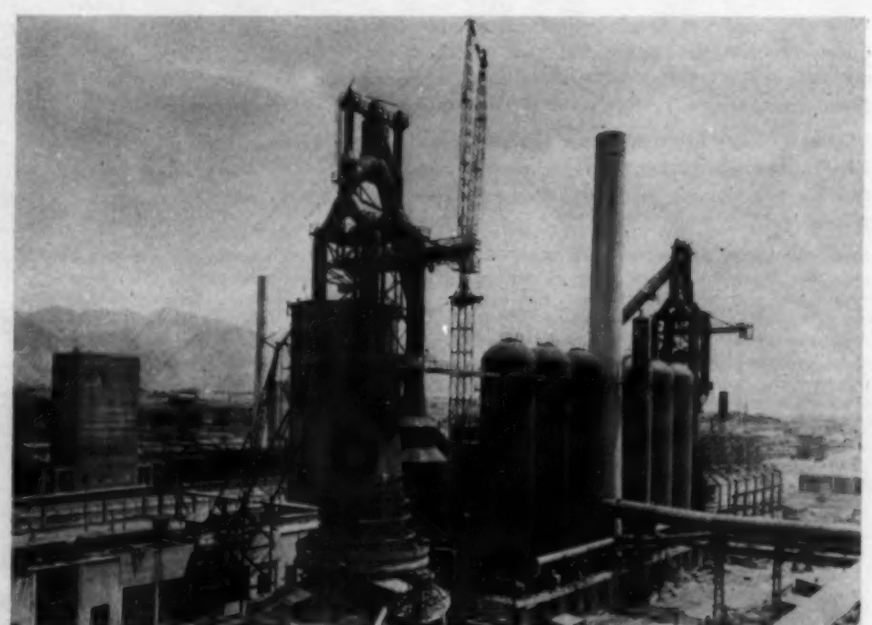
Rheem Mfg. Co., South Gate, Calif., for equipment at a plant in California, $110,000.

Lombard Iron Works Co., Augusta, Ga., $60,000 for additional equipment at a plant in Georgia.

New Pipe Line Will Take 215,000 Tons of Steel

Construction of a new 1200-mile natural gas pipeline from the southwest to the Appalachian manufacturing area for the winter of 1944-45 has been approved. War Production Board has advised the Federal Power Commission that it would issue necessary authorization for materials as soon as the commission decides whether Tennessee Gas & Transmission Co. or the Hope Natural Gas Co. will build the line.

Neither line has any substantial advantage over the other in requirements for critical materials and equipment, since both are slightly more than 1200 miles long and will require about 215,000 tons of steel. The completed line will be either 22 or 24-inch.



This close-up of No. 2 blast furnace of the Geneva Steel Works, near Provo, Utah, shows the immensity of the plant being built by Columbia Steel Co. for the government. When completed, the $180,000,000 plant will embrace more than 1600 acres

National Malleable Celebrating 75th Anniversary

Booklet portrays interesting history serving many industries such as iron and steel, railroads and mining

National Malleable & Steel Castings Co., incorporated in Cleveland in 1868 as the Cleveland Malleable Iron Co., this year is celebrating its 75th anniversary.

Founders of the company were Alfred A. Pope, John C. Coonley, J. H. Whittemore, and Bronson B. Tuttle. Other malleable iron foundries were established in Chicago, Indianapolis, and Toledo and in 1891 were combined to form the National Malleable Castings Co. Present name was adopted in 1923. A 36-page illustrated book, portraying the company's history, is being distributed to customers, stockholders and employes.

National headquarters and research laboratories are maintained in Cleveland with plants situated in Cleveland, Chicago, Indianapolis and Sharon, Pa. Sales offices are located in Cleveland, Indianapolis, Chicago, New York city, Philadelphia, St. Louis, and San Francisco.

Some of the industries served by the company are iron and steel, metal mining, coal mining, agricultural implements, pipe lines, construction, hardware and plumbing, automotive, railroads, and shipbuilding.

Officers include Henry F. Pope, chairman of the board; Charles H. McCrea, president; James A. Slater and Walton L. Moody, vice presidents; Cleve H. Pomeroy, secretary and treasurer; Wilson H. Moriarty, assistant to president, and Benjamin Nields, assistant vice president. Directors are Henry F. Pope, Charles H. McCrea, W. G. Kranz, Cleve H. Pomeroy, James A. Slater, Howard Coonley, Herbert Pope, Donald S. Tuttle, and Harris Whittemore Jr.

BRIEFS . . .

Cleveland Cap Screw Co., Cleveland, announces organization of an aircraft parts division under the direction of Howard R. Rusk.

—o—

P. R. Mallory & Co. Inc., Indianapolis, Ind., has been awarded a third star for the "E" pennant won in January, 1942.

—o—

Weirton Steel Co., Weirton, W. Va., held a labor day celebration on Sept. 4 and Sept. 6 with all branches of the armed forces represented by six men decorated for service under fire in war theatres. Outstanding feature was a patriotic pageant.

—o—

American Gear Manufacturers Association will hold its fall meeting at Edgewater Beach hotel, Chicago, Oct. 25-27.

—o—

Macwhyte Co., Kenosha, Wis., has been presented with its second Army-Navy "E" award. First award was received by the company on Nov. 21, 1942.

—o—

Dow Chemical Co. has opened additional offices in the eastern area. New York offices have been maintained for several years under the management of Ralph E. Dorland. Clayton S. Shoemaker has been appointed eastern sales manager and Frederick A. Koch, assistant.

—o—

Duraloy Co., Scottdale, Pa., producer of static and centrifugal high alloy castings, announces appointment of Robert Onan as sales representative in Chicago and Kilsby & Graham as agents in the California area.

—o—

Metallizing Co. of America announces purchase of a building at 135 Cedar street, New York city, for eastern sales headquarters and service operations in that area.

—o—

Mills Industries Inc., Chicago, is the newly adopted corporate name of the Mills Novelty Co., effective Sept. 1.

—o—

Webster-Brinkley Co. was presented an additional gold star for its "M" burgee on Aug. 25.

—o—

Craft Mfg. Co., Chicago, announces removal of general offices and factory to 3949 W. Schubert avenue, Chicago.

—o—

Tulsa Chemical Co. was incorporated July 1 with headquarters at Tulsa, Okla. Interest in the company is divided among the Pennsylvania Salt Mfg. Co., Philadelphia, Mahoning Mining Co., Rosiclare, Ill., and Ozark Chemical Co., Tulsa.

—o—

Westinghouse Electric & Mfg. Co., Pittsburgh, has leased a three story building at 24 Warren place, Newark, N. J. It contains 10,000 square feet of space and will be used by the motor division.

—o—

Republic Steel Corp., Cleveland, announces purchase of the Everhard Mfg. Co., Camden avenue and Seventh street, S. W., Canton, O. The company is a producer of window screens and storm windows. It is entirely engaged in war production for the Army and Navy.

—o—

Coulter-Sibbett Steel Co. has been appointed distributor of Timken graphitic steels in Arizona and southern California, according to announcement by the Steel and Tube division, Timken Roller Bearing Co., Canton, O. Office and warehouse are located at 1801 East Slauson, Los Angeles, 11, Calif.

—o—

Earle M. Jorgensen Co., distributors of Timken graphitic steel in Texas and Oklahoma, have expanded their activities to include sale of graphitic steel in Arizona and Southern California.

Production Awards Granted To More Industrial Plants

Additional metalworking and metal-producing plants have won Army-Navy production awards for outstanding performance in war production. Plants honored follow:

Aro Equipment Corp., Cleveland.
Barlow & Seelig Mfg. Co., Ripon, Wis.
E. J. Brach & Sons, Chicago.
Chicago Telephone Supply Co., Elkhart, Ind.
Coast Centerless Grinding Co., Los Angeles.
Ferro Machine & Foundry Co., Cleveland.
Great Lakes Spring Corp., Chicago.
Infilco Inc., Chicago.
Le Roi Co., West Allis, Wis.
Micro Switch Corp., Freeport, Ill.
Nash-Kelvinator Corp., Lansing, Mich.
National Union Radio Corp., Newark, N. J.
Pfaudler Co., Elyria, O.
Babcock & Wilcox Co., Alliance, O.
Central California War Industries Inc., Fresno, Calif.
Craftsweld Equipment Co., Long Island City, N. Y.
Hamilton Foundry & Machine Co., Hamilton, O.
Hazeltine Electronics Corp., Long Island, N. Y.
Herman Pneumatic Machine Co., Zelienople, Pa.
King Machine Tool Co., Cincinnati, O.
McGraw Electric Co., Elgin, Ill.
Midwest Piping & Supply Co., Los Angeles.
Minneapolis Electric Steel Castings Co., Minneapolis, Minn.
Shenango-Penn Mold Co., Dover, O.
Twin Disc Clutch Co., Racine, Wis.
Warren Steam Pump Co., Warren, Mass.

Sellstrom Mfg. Co. Celebrates Anniversary

Sellstrom Mfg. Co., Chicago, organized in 1923 under the presidency of the late G. A. Peterson, celebrated its twentieth anniversary of business with a noon-day luncheon for management and employes.

The company occupies a six story building where it manufactures and distributes a complete line of safety equipment for eyes and face such as goggles, helmets, shields, lenses, respirators and similar products. G. E. Sellstrom is president of the company.

DYNAMIC LOS ANGELES PLANS FOR THE FUTURE

Area, now fifth industrially in the nation, moving ahead with aggressive plan for adapting war-swollen economy to peacetime role. . . Seeks efficient development of region's natural resources, greater manufacturing self-sufficiency

By A. H. ALLEN
Associate Editor, STEEL

"DYNAMIC metropolitan Los Angeles is the capital of the western civilization," modestly proclaims the Los Angeles Chamber of Commerce, adding that "industrial development in Los Angeles county has been a march of giants. The area now ranks in the first five of the nation, and contains more branch plants of nationally known manufacturers than any other metropolitan district of the west."

If you can tone down the hoop-la a little, the statements probably are factually correct, but like the rest of the West Coast, Los Angeles sees plenty of shoals ahead, and is taking steps now to circumnavigate them.

If you doubt the industrial potency of Los Angeles county today, the industrial department of the Chamber of Commerce will throw figures at you until you're dizzy. Ninety-nine million dollars worth of new plants built in 1942. Second area in the country with respect to volume of war contract backlogs. Fifth industrial county in the United States. Formerly second only to Akron, O., in manufacture of rubber tires. Fifty-five synthetic rubber projects now under way. Sixty aluminum foundries. Sixty-four plastic molding companies. Two aluminum extrusion plants and one reduction plant. A total of 5800 manufacturing plants, with 5000 member companies in the chamber. Roughly 1000 prime and subcontractors in the aviation business, employing over 300,000. Seventy thousand workers in shipyards. And so on.

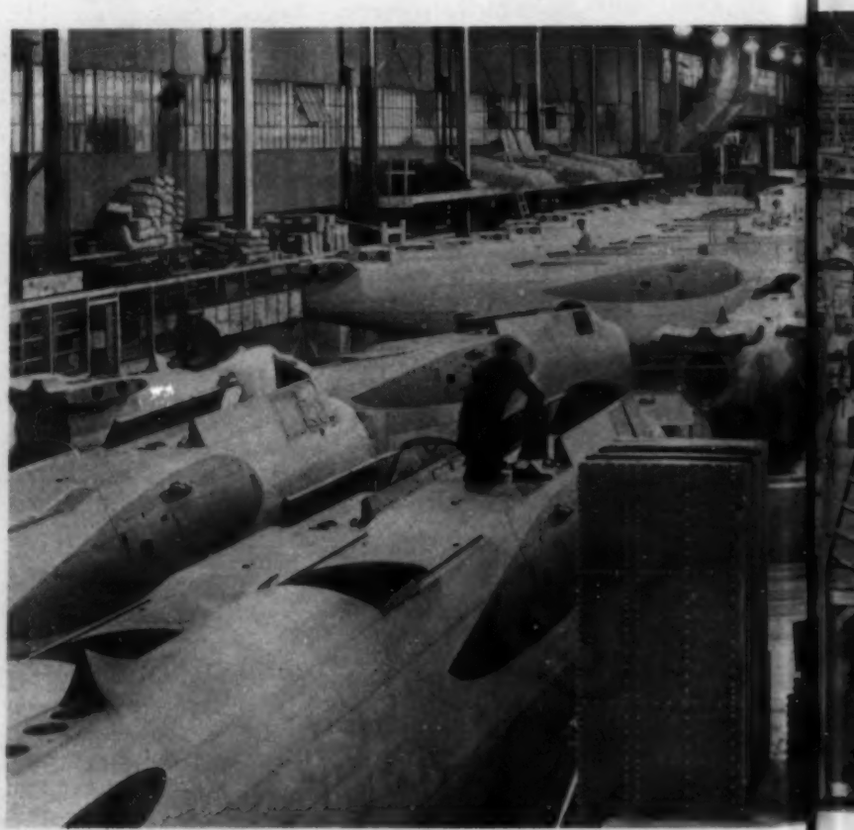
These are cold hard facts. You can laugh all you want about the braggadocio of the Los Angeles Chamber of Commerce, the liquid sunshine, the high fogs and the city limits signs in Arizona, but there is one fact that is inescapable: The chamber is a well-organized, driving force in all phases of progress in southern California—cultural and industrial—to a far greater extent than similar bodies in any eastern or middle western city. The results of this aggressive policy speak for themselves. Even now the industrial department of the chamber under direction of James F. Bone is well along on a concrete, positive plan for maintaining some semblance of current industrial activity in postwar years, attracting new industries to the area, and in particular building up more basic industries to supply materials and equipment formerly brought in from other sections of the country.

It may be of interest to sketch the outlines of the industrial development plan drawn up by Bone and his associates for Los Angeles county. Essentially the plan looks toward enabling the community to do a better war production job and secondly toward working with industrial prospects who are looking ahead and considering factory locations for the manufacture of goods under a civilian economy—in other words, a blueprint for action.

Basic policy of the program has 11 phases, as follows:

1. To promote industries necessary for the balanced economic development of the country and its trade area.

2. To promote efficient and economical use of all natural resources available in



the Southwest through the industrial extraction, refining, processing and fabrication of these resources.

3. To seek, foster and co-operate with research laboratories of universities, government and private foundations looking toward the development of new techniques in the treatment of basic resources and local materials.

4. (And this is an important one). To discover products for which a market exists in southern California but which are not produced there; to determine if such products can be made there economically and if so to call these opportunities first to the attention of manufacturers already operating in the area. Failing to find interest locally it is proposed to call these opportunities to the attention of manufacturers elsewhere who may be interested in capitalizing on them.

5. To seek continuously the development of industries producing basic materials and equipment utilized by industry, thus helping to lower the manufacturing costs of fabricators already operating in the area, thereby placing them in a position to extend their markets.

6. To encourage proper utilization of industrial real estate within the county, thereby maintaining property values and tax revenues.

7. To avoid subsidy of new industry through such devices as free sites, promotional financing, tax exemptions and the use of the chamber's name in financing operations.

8. To encourage and foster vocational training and protect the right of labor to work without prejudice to its interests by virtue of membership or lack of membership in any union. (Los Angeles, in contrast to other Coast cities, is largely an open-shop area, and its business men feel most keenly about organizational incursions such as the UAW-CIO has attempted in the aircraft plants with almost no success. Freedom of business and industry from widespread unionization has meant lower living costs in Los Angeles, but of course labor is quick to pick up this fact as pointing to subnormal wage levels.)

9. To oppose any legislation detrimental to the development of industry coming within the confines of these enunciated policies.

10. To utilize and capitalize on the rail, water, motor truck and air transportation facilities serving the county. (Here is a neat blanketing of the transportation question which avoids laying the cham-

At right is pictured a street scene in one of the busiest business sections of Los Angeles. The area ranks fifth in the nation industrially

Below is an interior view of one of the many airplane plants in the Los Angeles area. More than 200,000 persons are employed by aircraft plants in the Los Angeles area

ber open to charges of favoritism.)

11. To work toward the reduction of trade barriers existing between states and the discouragement of the erection of additional barriers between states.

Not mentioned in this Magna Charta for the future, still obviously an important factor is the encouragement of foreign trade around the Pacific rim for West Coast producers. If Los Angeles industry is to enhance its stature further, it must either compete successfully in eastern and middle western markets, or it must reach out for the lion's share of markets for consumer goods which are foreseen among nations bordering the Pacific ocean north and south.

Going a little further, the chamber has prepared detailed lists of materials available locally to Los Angeles, or available by rail or water import. Probing into the nature of present leading industries, it is seen that the Los Angeles area has concentrated in producing creature comforts, and has been characterized largely by the assembly and fabrication of materials into articles of high value rather than the processing and refinement of raw materials and natural resources. Motion pictures, sportswear, cosmetics, automobiles, petroleum products, tires, and tubes, furniture, airplanes, specialty food products, electrical appliances, pottery, dinnerware and art goods —these are the lines in which Los Angeles has directed the bulk of its industrial effort; that is, just prior to the present all-out war production. Markets have been extended by building original style, form or utility into products to create a buying urge. But this business is continually faced with loss of eastern trade because manufacturers there soon copy original Los Angeles products and undersell the West Coast suppliers.

Thus, the problem becomes one of finding ways and means to reduce the costs of West Coast producers without lowering wages, and the best way to do this appears to be the development of more basic industries utilizing materials and resources available in the Southwest. Here is the principal field for potential postwar progress all along the West Coast.

Lacks Basic Industries

What are these basic industries lacking in Los Angeles county, for example? Well, here is a list of a few types of plants in this category: Abrasives, hydrochloric and nitric acids, alumina preparation, aluminum sheet rolling, copper refinery, rolling and wire mills; cork, cotton mill, textile printing, ferroalloys, plate glass, window glass, hydrogen peroxide, lead smelter, lithopone, magnesium refinery and extrusion equipment, cast iron pipe foundry, seamless steel pipe, plastic powders, rayon mill and rayon weaving equipment, synthetic (alcohol) rubber plant, silk mill, tool steel mill, tannery, tin plate, tin smelter, titanium pigments, woolen mill, white lead, wire mill, zinc smelter.

Take a look now at some of the industrial materials and supplies used in quantity by Los Angeles manufacturers but not produced there. They include: Barium carbonate, dry batteries, bearings, small bolts and nuts, fancy bottles, buttons, milk and ice cream cans, calcium carbide, carboys, chalk, metal and 19 fiber conduit, drill bits, electric light bulbs, fluorescent lighting tubes, glass brick and blocks, grinding wheels, furniture and refrigerator hardware, hinges, pole-line hardware, lead foil, mohair, nails, pigments, sandpaper, wood screws, thread, tin foil, machining tools, carpenters' tools, metal collapsible tubes and zinc oxide.

In preferred position because of their more pressing need, particularly since they relate to present war contracts, are the following new plant possibilities: Aluminum sheet rolling, airplane and marine engines, ferromanganese, ferrotungsten, magnesium extrusions and forgings, plastic powders and sheets, plywood, propellers, guayule rubber, tool steel and tools for machining operations.

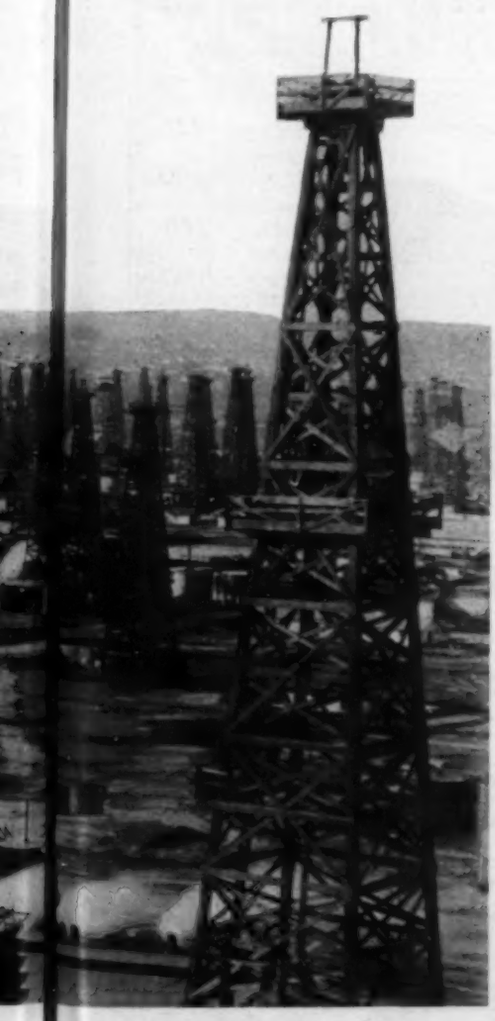
This exploratory work by the Chamber of Commerce has been well received by Los Angeles industry. Already more detailed surveys are being conducted for at least 20 companies now engaged in war production work, principally aviation, seeking to line up specific types of manufacturing and products to which these plants can be converted when war orders dwindle.

The five principal airframe manufacturers—Douglas at Santa Monica, El Segundo and Long Beach; North American at Inglewood; Vultee at Downey; Lockheed and Vega at Burbank, and

Tankers and tank cars shuttle northward along the Pacific coast with their cargoes of petroleum products obtained from such rich fields as this one located in southern California. California is regarded as the oil reservoir of the west but reserves are declining

Northrop at Hawthorne—know that the present inordinately high level of aircraft production will hit the skids probably the moment Germany and Italy are beaten. They realize that while a measure of airplane production will be continued for the Army and Navy, and for foreign governments, it will be in no wise possible to keep better than 200,000 men and women on the payrolls unless some types of consumer goods manufacture can be undertaken. So they are looking over the field with large magnifying glasses.

Lookheed-Vega is said to have explored the possibilities of manufacturing over 140 types of consumer products, and the company's recent acquisition of Pacific Finance Co. lends credence to plans for mass production and selling of some type of consumers goods. Other market research staffs are studying electric typewriters, washing machines, stoves, refrigerators, automobiles, whatnot, in the effort to have something ready to put into production when the war load eases. But the principal problem will not be so much one of manufacturing as it will be sales and distribution. After all, a warehouse full of 1,000,000 new low-cost air conditioning units means little if there is no merchandising program ready to line up dealers and customers to take the product.



Postwar shipbuilding may be slated for the skids on the Coast but another California industry—oil and its by-products—seems destined for marked acceleration. California is the oil reservoir for the West and even now tankers and tank car trains shuttle back and forth from southern California to the various cities northward with cargoes of petroleum. The fields at Signal Hill, Venice and other sections around Los Angeles, with their thousands of wood and steel derricks dotting the landscape, have been landmarks for years. Back in the good old days of 1930 these wells pumped over 135,000,000 barrels of crude annually; they are now down well under 100,000,000 barrels annually, or about one-third of the total production for California.

Oil Reserves Declining

But the sad story on oil is that reserves are petering out, now being set at only 10 to 15 years. H. D. Collier, president, Standard of California, is quoted as saying that within five years California will have to be importing 150,000 barrels a day or at a rate of 50,000,000 barrels a year. Other oil company executives agree that the banner years of crude production (and consumption, too, for that matter) are past in California.

Coincident with this startling news is the shifting of oil production, refining and by-product manufacture from southern California to the San Francisco Bay area where a booming industrial chemicals industry based on petroleum is in the making.

Standard of California says it is processing about half the crude oil in California north of the Tehachapi range which divides southern California from the Bay area. Even oil from fields at Bakersfield and Taft, nearer to Los Angeles than to San Francisco, is being pumped into the Bay region because it is less expensive to do so than to push it up over the Tehachapi and down to Los Angeles. Many astute industrialists think new developments in petroleum technology will do more to rescue the postwar West Coast than all the planning which aggressive committees can now conceive. Paint bases, industrial solvents, plastic powders, fertilizers, synthetic rubbers—these and many other new materials will spring from advanced techniques in processing of petroleum, and San Francisco will be a focal point in their supply.

In respect to general living and working conditions, a hot spot on the West Coast is San Diego which has experienced a population increase of just about 100 per cent since 1940. The present total is close to 400,000. Most of this increase is the result of expanded operations at Consolidated Vultee Aircraft which operates two huge plants about a mile apart on opposite sides of Pacific Highway. On top of the boom at Consolidated thousands more have come into the area in connection with activity at naval and marine bases. The quiet restfulness of San Diego which used to attract retired millionares has been rudely shattered if not completely dissipated.

Numerous agencies in addition to the Los Angeles Chamber of Commerce are vigorously attacking the postwar problem of Los Angeles and the entire West Coast. The United States Chamber of Commerce, trade associations, individual industries, and organizations like Paul Hoffman's Committee for Economic Development are all busy.

Expenditure of $142,000,000 and employment of an average 70,000 for the first six years after the war is envisioned by the Los Angeles city council which has approved its engineer's survey report calling for disbursement of $36,000,000 on public works the first year after the war when the need for jobs will be at a peak, and $106,000,000 over the next five years.

Crowded with Industrial Workers

Of a few things the West Coast can be sure. The war's end will see a plethora of people, plants and materials ready and waiting on the West Coast. The swollen ranks of industrial workers will be difficult to dissipate, many of them already having purchased new homes and settled on the Coast for good. A moderate climate and the scenic beauty of the region are powerful magnets to counteract occasional homesickness. California alone will have 340,000 returning soldiers. Hundreds of thousands of other service men whose homes are in other parts of the country but who have been stationed on the West Coast doubtless will decide to stay there and make their fortunes. The sprawling aircraft plants, shipyards, aluminum and magnesium plants, hydro-electric projects, foundries and other war-built enterprises will still be there.

What the formula is for compounding men, machines and materials into peacetime prosperity no one knows, but one can be sure the aggressive spirit and dynamic drive of western industrial leaders will be seeking it out, and the chances are good they may find it.

This article is the fourth of a series. The fifth will appear next week.

THE BUSINESS TREND

Output Gains Hinge on Improved Labor Supply

LITTLE change in industrial activity occurred during the latest weekly period. Steel ingot production remained at record levels on a tonnage basis, limited only by necessary open-hearth furnace repairs; bituminous coal output and engineering construction receded moderately; truck and automobile assemblies recorded a slight gain, and electric power consumption established a new all-time record. Revenue freight carloadings registered a small increase to reach the highest level attained this year.

Key war plants are continuing to encounter difficulty in expanding output because of manpower shortages, while scarcity of critical materials is hampering production in some instances.

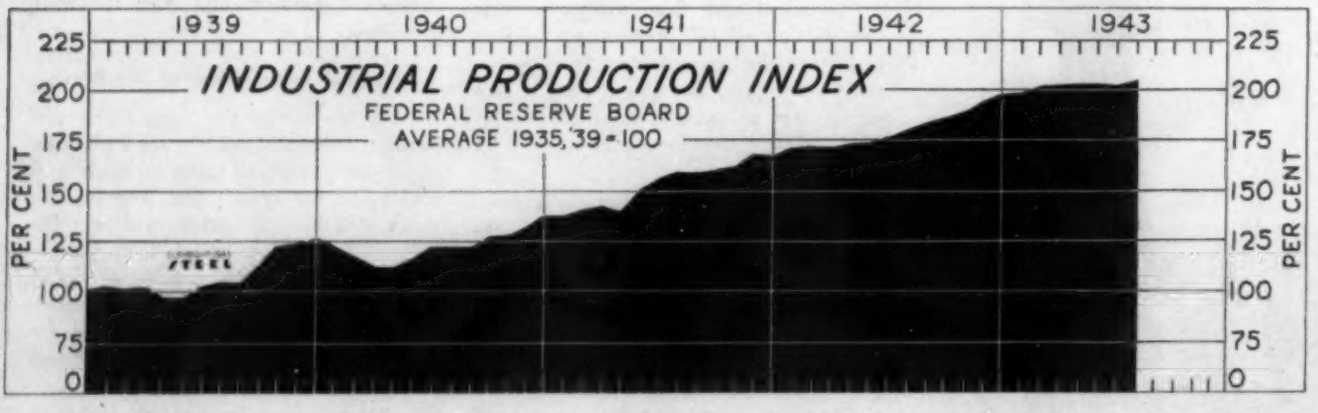
CONSTRUCTION—While both public and private construction activity has declined sharply this year, building firms are shaping plans for postwar activity. F. W. Dodge Corp. predicts an increase of 30 per cent in new industrial plant construction in the ten years after the war, compared with the prewar decade. Postwar housing construction is expected to be three times the volume of the depression-restricted decade of the thirties.

Building construction during July recorded the fifth consecutive monthly decline to $183.7 million. With the exception of residential building, construction in each of the major classifications declined in the latest period.

Bookings of fabricated structural steel during July of 63,220 tons were slightly more than half that recorded in the like period last year, and represented a sharp decline from the June total of 100,427 tons. Fabricated structural steel shipments recorded the fourth consecutive monthly decline, with 60,962 tons for July, compared with 81,843 in June and 189,937 in like month a year ago. Tonnage available for future fabrication as of July 31 totaled 286,279 tons. This is in sharp contrast with 808,600 tons on like date a year ago.

JULY PRODUCTION—A new peak in industrial output occurred during July, following a moderate decline in the preceding month. Both changes were ascribed largely to fluctuations in bituminous coal output. The Federal Reserve Board's index of industrial activity rose three points during July to a new high of 205; a year ago the index stood at 178. Reflecting the improved coal supply situation, the board's index of iron and steel output for July was up two points to 203. The index registering activity in nonferrous metals and products was off six points during July to 189.

In manufacturing industries output of most durable products continued to increase throughout July, reflecting a rise of three per cent in production of munitions. WPB index figure on munitions output stood at 593 for July, compared with 339 recorded in the corresponding period last year.



FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	98.5	98.5	98.0	98.0
Electric Power Distributed (million kilowatt hours)	4,322	4,265	4,227	3,640
Bituminous Coal Production (daily av.—1000 tons)	1,992	2,017	1,983	1,844
Petroleum Production (daily av.—1000 bbls.)	4,218	4,239	4,119	3,972
Construction Volume (ENR—unit $1,000,000)	$40.6	$41.6	$41.2	$217.8
Automobile and Truck Output (Ward's—number units)	20,055	19,820	19,900	21,100

*Dates on request.

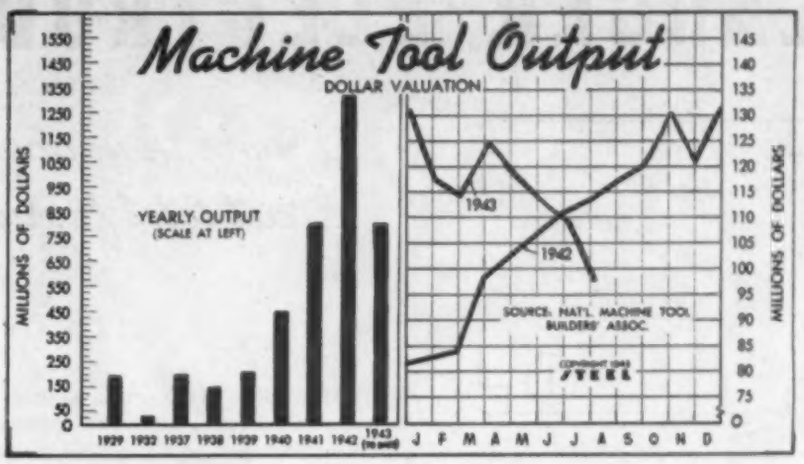
TRADE				
Freight Carloadings (unit—1000 cars)	895†	891	886	899
Business Failures (Dun & Bradstreet, number)	45	54	48	147
Money in Circulation (in millions of dollars)‡	$18,303	$18,241	$17,799	$13,037
Department Store Sales (change from like week a year ago)‡	+4%	+7%	+20%	None

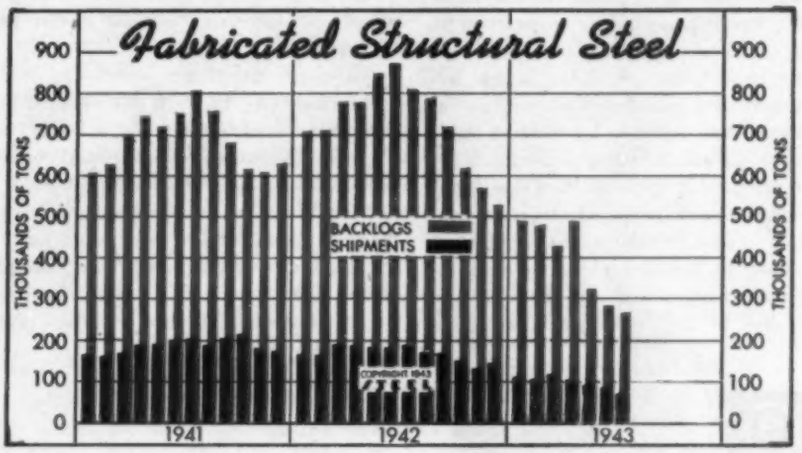
†Preliminary. ‡Federal Reserve Board.

Machine Tool Output

(000 omitted)

	1943	1942	1941
Jan.	$117,384	$83,547	$50,700
Feb.	114,593	84,432	54,000
Mar.	125,445	98,358	57,400
Apr.	118,031	103,364	60,300
May	113,710	107,297	60,800
June	108,689	111,093	69,070
July	97,428	113,596	63,019
Aug.	.....	117,342	70,069
Sept.	.....	119,883	74,906
Oct.	.....	130,008	84,178
Nov.	.....	120,871	81,320
Dec.	.....	131,960	81,435
Year			
1942	.....		1,321,862
1941	.....		812,462
1940	.....		450,000
1939	.....		210,000


Machine Tool Output
DOLLAR VALUATION
YEARLY OUTPUT
(SCALE AT LEFT)
1943
1942
SOURCE: NAT'L MACHINE TOOL BUILDERS' ASSOC.
STEEL
MILLIONS OF DOLLARS
1929 1932 1937 1938 1939 1940 1941 1942 1943 (to date)
J F M A M J J A S O N D



Fabricated Structural Steel†

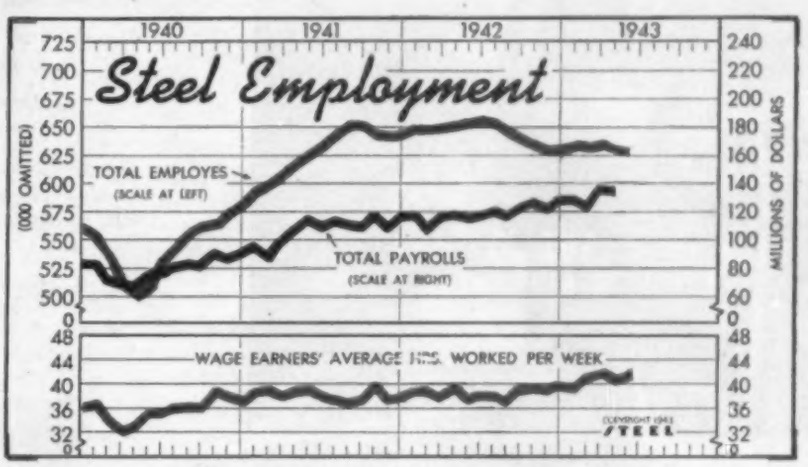
(1000 tons)

	Shipments			Backlogs		
	1943	1942	1941	1943	1942	1941
Jan.	109.9	167.8	164.6	489.3	704.4	601.5
Feb.	109.1	164.6	161.4	475.6	706.7	624.2
Mar.	113.3	191.3	170.2	424.4	777.7	697.2
Apr.	102.5	187.2	189.8	385.3	772.4	741.9
May	94.9	184.2	191.9	306.6	843.8	718.9
June	81.8	182.7	200.5	290.3	869.8	747.4
July	61.0	189.9	203.0	286.3	808.6	802.7
Aug.	.....	173.9	189.3	.....	783.5	754.5
Sept.	.....	169.8	204.1	.....	716.0	678.5
Oct.	.....	152.9	217.7	.....	617.7	614.4
Nov.	.....	130.4	182.6	.....	566.6	602.9
Dec.	.....	145.3	176.1	.....	523.5	626.0

†Source: American Institute of Steel Construction.

Steel Employment

	Employes—Number (000 omitted)		Total Payrolls (Unit—$1,000,000)	
	1943	1942	1943	1942
Jan.	637	651	129.7	118.8
Feb.	635	651	122.8	108.5
Mar.	637	653	136.8	117.0
Apr.	634	654	133.3	118.5
May	632	656	137.4	117.4
June	631	659	136.2	118.0
July	...	655	.....	120.7
Aug.	...	647	.....	118.7
Sept.	...	641	.....	124.8
Oct.	...	635	.....	126.6
Nov.	...	632	.....	122.8
Dec.	...	633	.....	129.3



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—billions)	$7,446	$8,333	$7,936	$6,232
Federal Gross Debt (billions)	$147.6	$147.3	$144.8	$85.8
Bond Volume, NYSE (millions)	$28.6	$34.1	$70.1	$43.4
Stock Sales, NYSE (000)	2,698	2,941	8,162	1,788
Loans and Investments (millions)†	$47,040	$46,899	$46,612	$34,517
United States Government Obligations Held (millions)†	$34,574	$34,437	$32,510	$20,425

†Member banks, Federal Reserve System.

PRICES

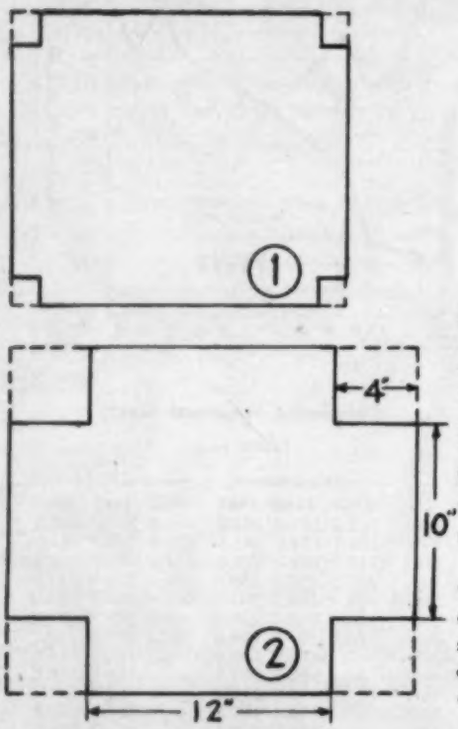
STEEL's composite finished steel price average	$56.73	$56.73	$56.73	$56.73
Spot Commodity Index (Moody's, 15 items)†	246.9	245.2	243.8	231.1
Industrial Raw Materials (Bureau of Labor index)†	112.7	112.3	113.3	101.0
Manufactured Products (Bureau of Labor index)†	100.0	100.0	99.8	99.1

†1931 = 100; Friday series. ‡1926 = 100.

LARGER ELECTRODES . . . .

..more than double welding speed ..cut total fabricating time by 30 per cent

By GEORGE WOOD
Plant Superintendent
Bryant Heater Co.
Cleveland



MANUFACTURE of large size fuse boxes for housing electric control equipment for vital gun-firing mechanisms involves fabricating of sheet steel sections by arc welding, according to practice at plant of Bryant Heater Co., Cleveland. There production of these boxes has been increased substantially by acting on recommendations made by welding engineers of Lincoln Electric Co.

In explaining some of the significant welding procedures used to increase production rates, it is pointed out that switching to a larger electrode size reduced fabricating time by about 30 per cent due to the resulting increase in welding speed from about 12 inches per minute to approximately 30 inches per minute.

Although relatively small in size, measuring only 12 x 10 x 4 inches, the fuse box is of interesting design, (see Fig. 6), tolerances of plus and minus 0.030-inch being required throughout.

Metal for the box proper consists of 47-S-10 plain carbon sheet steel cut to specified dimensions. The box, of 13-gage, and cover of 12-gage, are die cut as shown in Figs. 1 and 2, then press

Fig. 1—Corners for cover are die cut as shown here prior to forming box cover

Fig. 2—Die cut flat sheet of 13-gage, 47-S-10 steel, prior to forming into box shape

Fig. 3—Intermittent welding technique used to fuse mounting straps to the box

Fig. 4—Corner welding seams of fuse box. Specially built positioner of ball and socket type permits tilting the work to the most effective position for depositing metal

Fig. 5—Arc welding cover bolt brackets—two to each side of the fuse box

formed to shape, producing a minimum number and length of seams to be arc welded. Only the four short corner joints are welded, the four bottom corners being obtained by bending.

After forming the box, the sides are first joined with a single tack weld at each of the four corners to retain the true shape in handling during subsequent welding operations.

Brackets and lugs are then spot welded in place—a total of 16 brackets being required for the box and 8 lugs for the cover. Correct positioning of these parts is obtained by means of special fixtures, one of which clamps to the sides of the box and one to the cover. Openings in these fixtures accommodate each box bracket, both inside and outside the box, and each of the cover lugs. Thus these parts are quickly located in position yet held to exact specifications.

In addition to the brackets and lugs, Z-angle strips of 16-gage mild steel are mounted inside the box, running the full length of each of the four sides near the top edge. This Z-channel forms a groove for installing the rubber gasket which will be explained later. A special clamping fixture is also used for positioning these strips prior to spot welding.

Parts Within Operator's Reach

Individual containers holding each separate kind of bracket, lug and length of Z-angle strip are located within convenient reach of the operator to facilitate this phase of the work.

When the units reach the arc welding operations, all component parts are in place, ready for final fabrication.

In each of the successive arc welding operations the same basic work positioner is used to effect maximum speed and efficiency, but demountable fixtures for holding the work are provided for each specific phase of the job.

Construction details of this unique work positioning unit are clearly shown in Fig. 4. It consists of a 3-inch diameter steel ball mounted between ¼-inch steel plates attached vertically to a flat base of the same metal. The threaded shaft extending from the ball can be tilted to any desired angle by simply loosening the handwheel at the side of one of the vertical pieces, adjusting the shaft and ball to the correct angle, then clamping the ball into a fixed position by tightening the handwheel. Each fixture has a threaded nut or coupling attached to the underside so that it can easily be attached to the threaded shaft. Thus the work can be rotated quickly for arc welding on any side or corner of the box or cover.

In the first arc welding operation, illustrated in Fig. 3, the two main mounting brackets are being fused to the bottom of the box. Positioning of these pieces is accomplished by laying each of the flat pieces of 3/16-inch bar stock parallel along two opposite sides of the box bottom and placing four intermittent welds along each side of the bar. Bars are 1¾ inches wide and 13 inches long.

The work is positioned at about a 30-degree angle as shown and welded downhand using 3/16-inch shielded arc electrode. This size electrode results in greater speed and efficiency compared with the ⅛-inch diameter size formerly used. Welding current is set at about 270 amperes.

Since the bar stock is considerably thicker than the sheet forming the box, the electric arc is directed more toward the bar stock in order to get desired penetration without burn-through in the thinner, 13-gage steel of the box itself.

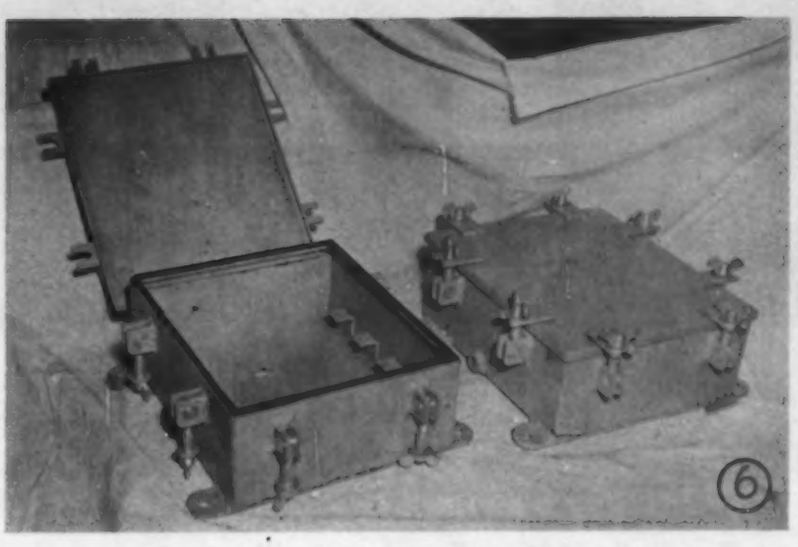
In this instance, the demountable fixture for the positioner is a plate which slips inside the box, permitting the work to be tilted at any angle.

Prior to welding along the under-side as shown in Fig. 3, the mounting brackets, or straps, are arc welded along their top-side to the side of the box and across the width of the strap, thus securing them in position for the final welds as previously described.

In welding the corner joints for the box, the holding fixture shown in Fig. 4 is used. It is made up of a steel plate section with an outside diameter larger than that of the box. In this case, a nut was welded to the bottom center of the fixture for attaching it to the threaded shaft of the positioner. This detail is clearly shown in Fig. 4. The box is held to the flat surface of the fixture by means of two studs set in the top of the plate and fitting through the hole in each end of one of the mounting straps.

Here again, the work is slanted at about 30 degrees and the seam is welded downhand, using the recommended 5/32-inch electrode with current set at 180 amperes. Formerly, ⅛-inch electrodes were used for this operation with propor-

(*Please turn to Page* 141)



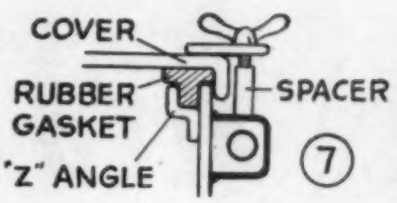


Fig. 6—"Open" and "closed" views of all-welded fuse box. Closed box shows method of clamping cover to make structure water-tight

Fig. 7—Cross section showing water and air-tight seal at cover with clamping arrangement

Fig. 8—Putting the finishing weld on the last cover bolt lug. Same type of positioning jig with different removable top fixtures is used throughout the operations

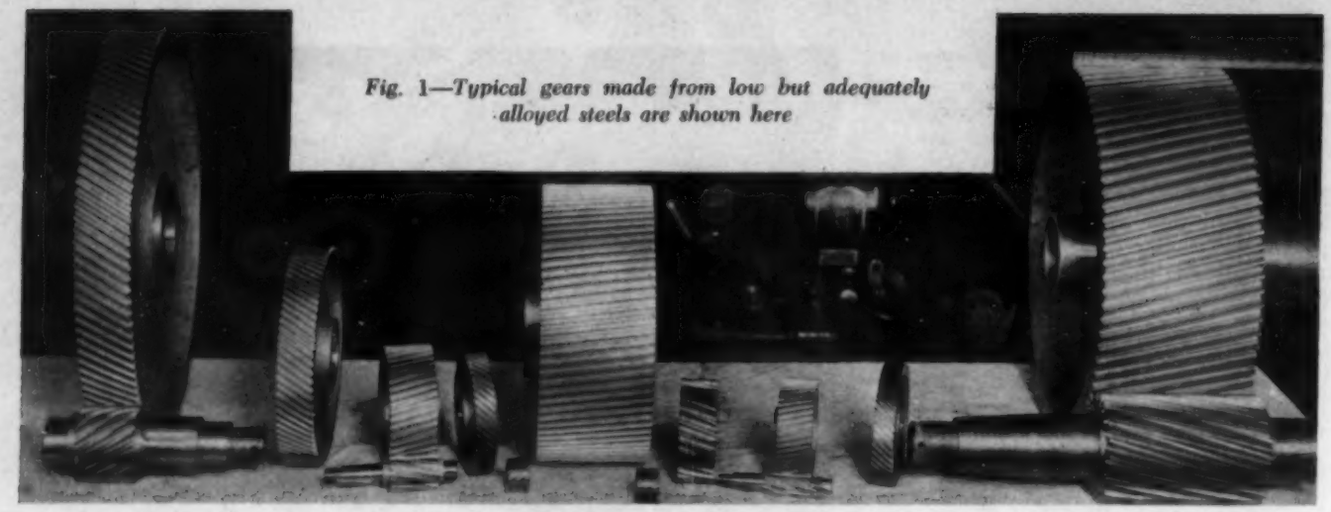


Fig. 1—Typical gears made from low but adequately alloyed steels are shown here

User Report No. 19 on Experience with . . . .

By E. J. WELLAUER
Supervisor
Research and Metallurgy
The Falk Corp.
Milwaukee

NE (National Emergency) ALLOY STEELS

Low but adequately alloyed steels have been used for industrial purposes well over 15 years. They have been employed by this company for more than 10 years. This experience forms the background for the discussion presented here concerning steels for use in industrial gearing

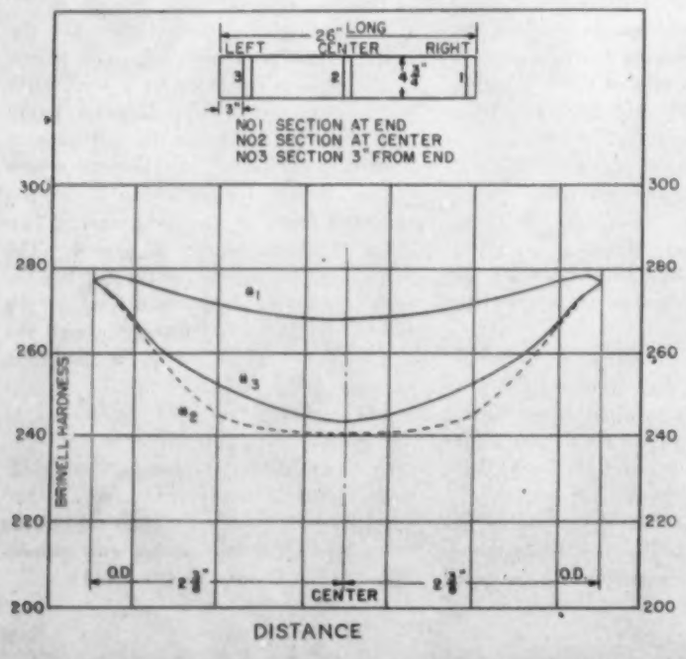
THE OLD ADAGE that there is no "new idea without a pedigree" has a pertinent application to the present use of the so-called lean alloy NE (National Emergency) steels. As a matter of fact, similar steels comparable in analysis, both as to alloys present and total alloy content, have been used for industrial purposes for well over 15 years.

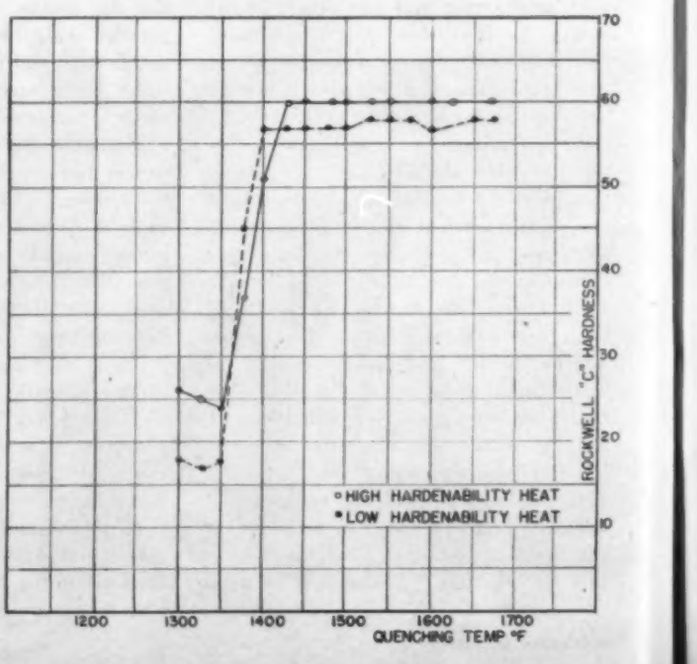
The following discussion covers over 10 years of experience with low alloy steels used for thousands of industrial gears particularly of the commercial and speed reducer types. Typical examples are shown in Fig. 1.

In selecting an alloy composition it was necessary to provide a steel capable of being heat treated to between 115,000 and 180,000 pounds per square inch tensile strength, and possessing a fairly high ratio of yield to ultimate strength. The steel had to be capable of being

Fig. 2. (Left, below)—Transverse hardness values in manganese-chromium-molybdenum steel

Fig. 3. (Right)—Water quench-out test, small specimens of manganese-chromium-molybdenum steel





treated in sections up to 4 inches diameter at the higher tensiles and up to 8 inches diameter at the lower tensiles.

The steel had to harden adequately when subjected to an oil quench used to minimize warpage and the hazard of cracking when variations in diameter occurred.

The performance of commercial gearing is primarily dependent upon the accuracy and tooth profile finish, therefore, excellent machinability is of the utmost importance. To obtain the high order of accuracy, it is usually necessary to cut after heat treatment. This is a definite problem where the hardness is 360 brinell or higher. Experience with standard SAE analyses indicated inadequate machinability and it was initially decided that some progress might be made with sulphurized steels.

Hardenability Only Difficult Factor

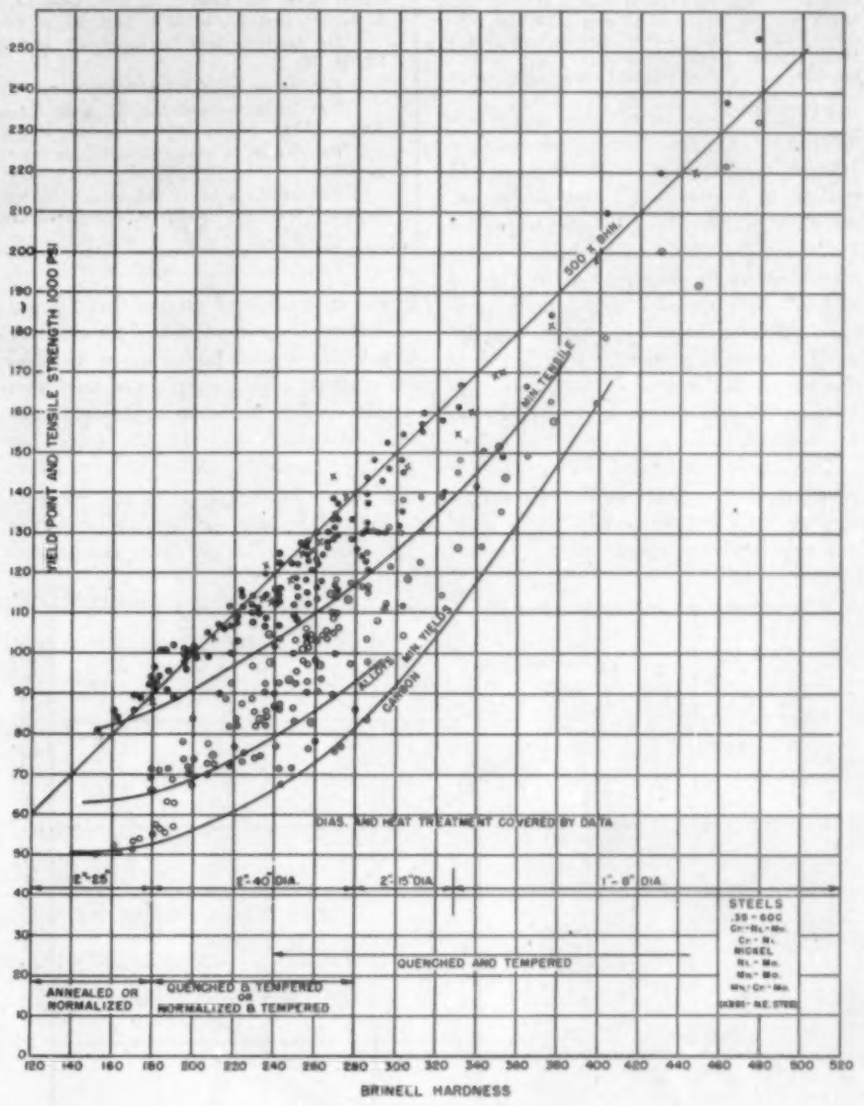
To obtain good wearing properties along with adequate hardenability, it was thought desirable to depend upon high carbon with additions of such carbide formers as manganese, chromium and molybdenum. A survey of available steels showed that material could be had from several sources, with analyses in the ranges shown below in per cent:

Carbon	0.35—0.50
Manganese	0.85—1.50
Chromium	0.30—0.85
Molybdenum	0.10—0.30
Sulphur	0.05—0.14

Steels having compositions within these ranges were used for several years, and the difficulties encountered pointed the way for adjustments to improve the performance. As might be expected, the only major difficulty experienced was hardenability. It was found that the carbon had to be increased to the upper limit for best results. Manganese definitely had to be over 1 per cent but to avoid danger of cracking had to be maintained below 1.50 per cent. Chromium for sufficient hardenability had to be above 0.50 per cent, although increases above 0.80 per cent adversely affected machinability.

Experience with sulphurized steels from 0.05 to 0.14 per cent sulphur showed the extremely high sulphurs did not increase the machinability proportionately and usually required higher manganese to produce a good rolling and forging steel. Extremely satisfactory results in regards to physical properties with moderate sulphurizing gradually increased the use of sulphurized steels particularly in view of the excellent machinability obtained.

Nickel was not specified since a residual was always secured ranging from 0.08 to 0.20 per cent. The early production runs were made with coarse-grained steels with a view of increasing the hardenability and machinability. A change was made a number of years ago to a fine-grained steel without noticeable differences in results, due mainly to the



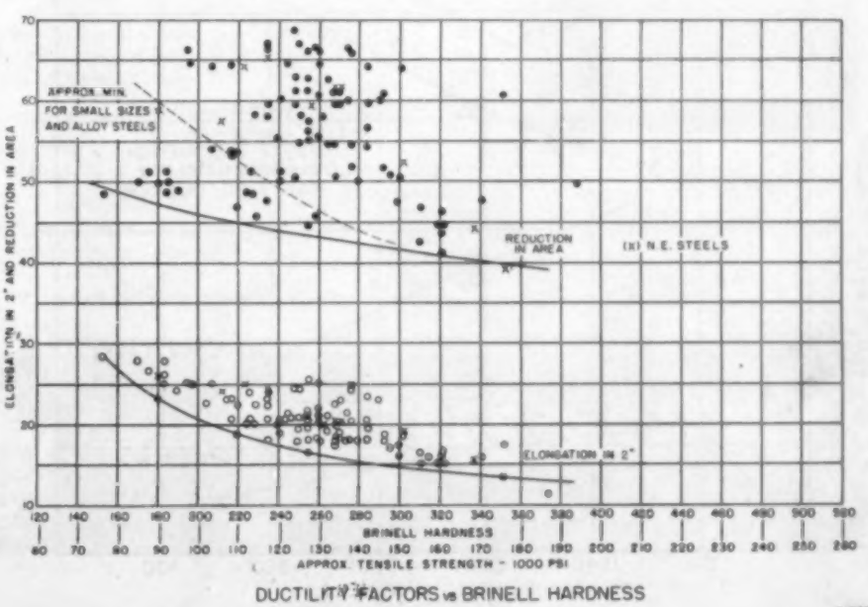

APPROX. MIN. FOR SMALL SIZES AND ALLOY STEELS
REDUCTION IN AREA
(X) N.E. STEELS
ELONGATION IN 2"
ELONGATION IN 2" AND REDUCTION IN AREA
BRINELL HARDNESS
APPROX. TENSILE STRENGTH - 1000 PSI
DUCTILITY FACTORS vs BRINELL HARDNESS

Fig. 4. (Right, above)—Tensile properties vs. brinell hardness

Fig. 5. (Right, below)—Ductility factors vs. brinell hardness, forged and rolled carbon and alloy steels

balance of alloys which had already been developed.

This experience resulted in the development of the following analysis for general purposes, which analysis is quite close to a number of "trade-name" alloys available today:

Carbon	0.47—0.57 aim 0.50
Manganese	1.00—1.35 aim 1.10 min.
Chromium	0.50—0.70 aim to high side
Molybdenum	0.10—0.20
Sulphur	0.06—0.10 (when sulphurized)

Physical Properties: The severe requirements of gear service demand a 100 per cent inspection of all gears and pinions to insure satisfactory properties. An early study of the tensile properties including ductility vs. the brinell hardness resulted in data plotted in Figs. 4 and 5. It is apparent that brinell hardness is a satisfactory check of the more important properties. Included in the curves are representative production tests on NE steels from sections of 1 inch to over 15 inches.

The curves indicated the properties of all steels are quite similar when possessing sufficient hardenability to meet a given hardness specification. Hence, it was reasonable to assume that the use of a low alloy steel would in no way impair the service performance of gears or pinions. This conclusion has been amply verified by many years of experience covering over 10,000 gears and pinions operating under widely differing circumstances.

Typical tensile and impact properties for various heats of the manganese-chromium-molybdenum steel discussed are plotted in Fig. 6. It is quite obvious that the characteristics are identical to those obtained with the standard higher alloyed steels.

For information on development of NE steels and data on their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41 and 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 2, p. 96; Dec. 28, p. 27; Jan. 25, 1943, p. 84; Feb. 22, p. 102; March 1, p. 94; March 8, p. 90; March 22, p. 78; March 29, p. 76; April 5, p. 116 and 118; Aug. 2, p. 100.

For reports from users of NE steels, see Nov. 16, 1942, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66; Feb. 1, p. 100; March 8, p. 109; March 15, p. 96; March 29, p. 72; April 26, p. 84; June 7, p. 106; June 14, p. 98; June 21, p. 92; July 26, p. 88; Aug. 2, p. 94; Aug. 23, p. 107; Aug. 30, p. 66.

For latest revised listing of NE ALLOY steels, see March 1, 1943, p. 98 and Aug. 30, p. 38.

For list of NE CARBON steels, see March 8, 1943, p. 90.

For latest revised list of AMS (Aeronautical Materials Specification) steels, see Aug. 9, 1943, p. 92. AMS nonferrous alloys are also listed there.

For details of WD (War Department) steels and complete listing, see Feb. 8, 1943, p. 80.

For STEEL's latest "Handbook on NE Steels" and the "NE Steel Selector", address Readers' Service department, Penton building, Cleveland. Price $1.00 per set.

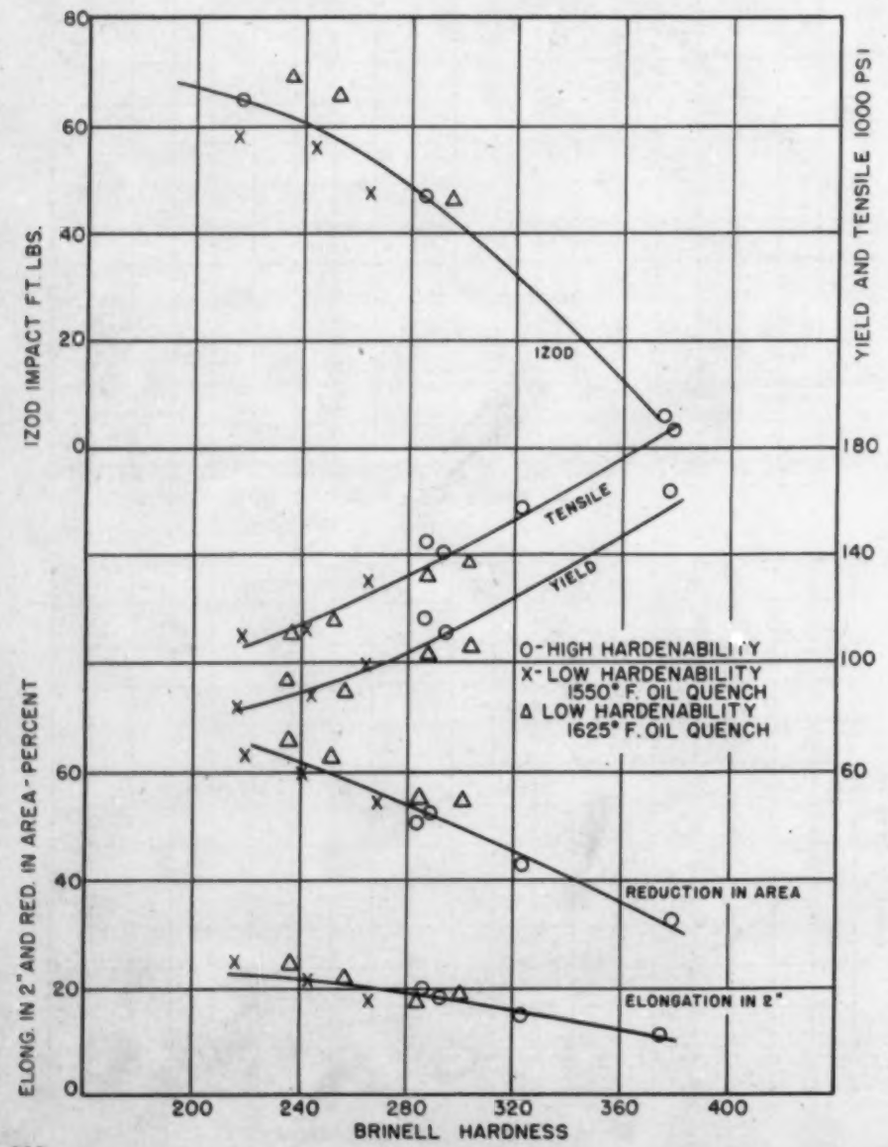

IZOD IMPACT FT LBS.
YIELD AND TENSILE 1000 PSI
ELONG. IN 2" AND RED. IN AREA - PERCENT
BRINELL HARDNESS
IZOD
TENSILE
YIELD
REDUCTION IN AREA
ELONGATION IN 2"
O - HIGH HARDENABILITY
X - LOW HARDENABILITY 1550° F. OIL QUENCH
Δ LOW HARDENABILITY 1625° F. OIL QUENCH

Fig. 6—Physical properties of 3½-inch rounds oil quenched from 1550 and 1625 degrees Fahr.

Production Heat Treatment: As might be expected, the problem of heat treating low alloy steels is entirely one of variations in hardenability. The variations between heats of low alloy steels has a greater effect upon production heat treatment than proportional differences with higher alloys. The following are but a few typical examples of difficulties which can be expected by the user of low alloy steels, particularly when the sections involved are over 2 to 3 inches.

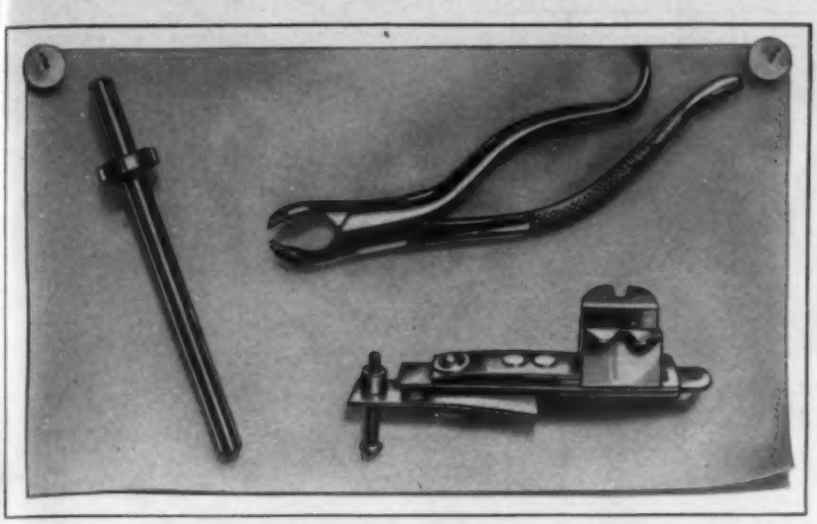
When heat treating high alloy steels, the smallest section cannot have a hardness higher than that corresponding to the carbon content. If the alloy is sufficiently high to transform the large section, a fairly close hardness differential will exist. However, a low alloy steel on the low hardenability side will result in an appreciable difference in final hardness as shown in the following table:

HARDNESS VARIATIONS

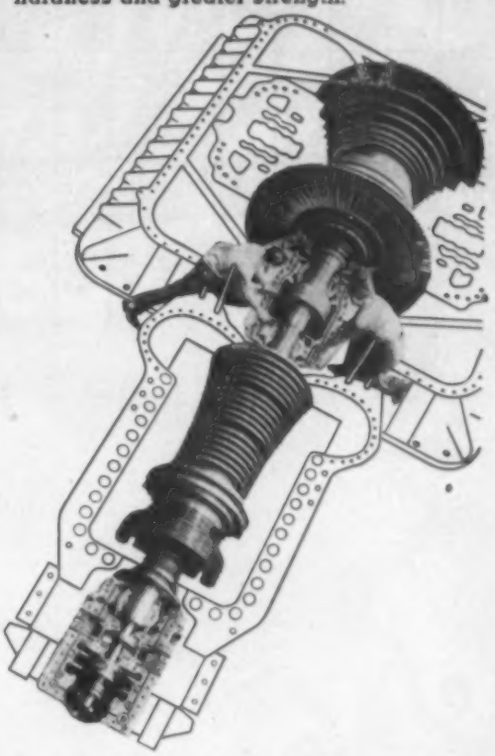
Low Hardenability Manganese-Chromium-Molybdenum Heat: Stepped Shaft—Oil Quenched 1600°F.

Step		Brinell
Diameter	Length	Hardness
1¾"	1¼"	415
2¼"	4¾"	363
3¾"	4¾"	341

There are applications which cannot have such a high differential in hardness. A number of procedures can be utilized to overcome such difficulties when found in heats of low hardenability. The shaft can be quenched in the rough before machining, using a water quench if a higher hardness is desired. As an alternative, the small



Long-wearing *valve stems, heat control assembly units and dental instruments are made from Carpenter Stainless—for positive protection against corrosive elements, extra hardness and greater strength.*



Strength . . . *corrosion resistance and uniformity are all provided by the Carpenter Stainless used for precision turbine blades. And many other Stainless products stay on the job longer because of Carpenter's rigid quality control.*

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Ask for your copy of this useful book if you are designing new or improved products, or if you could use information on these Stainless fabricating operations:

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- *Blanking*
- *Grinding*
- *Heat Treating*
- *Shearing*
- *Welding*
- *Machining*
- *Punching*
- *Soldering*

"Working Data for Carpenter Stainless Steels" is offered free to Stainless users in the U. S. A.—so for your copy drop us a note on your company letterhead.

The Carpenter Steel Company · 139 W. Bern Street, Reading, Pa.

Faster fabricating *with fewer rejects is made possible with soft and ductile Carpenter Stainless Strip. Uniformity of gauge and working properties—coil after coil—reduces rejects and saves time. And note how the long edges on this part were folded flat on themselves without cracking.*

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

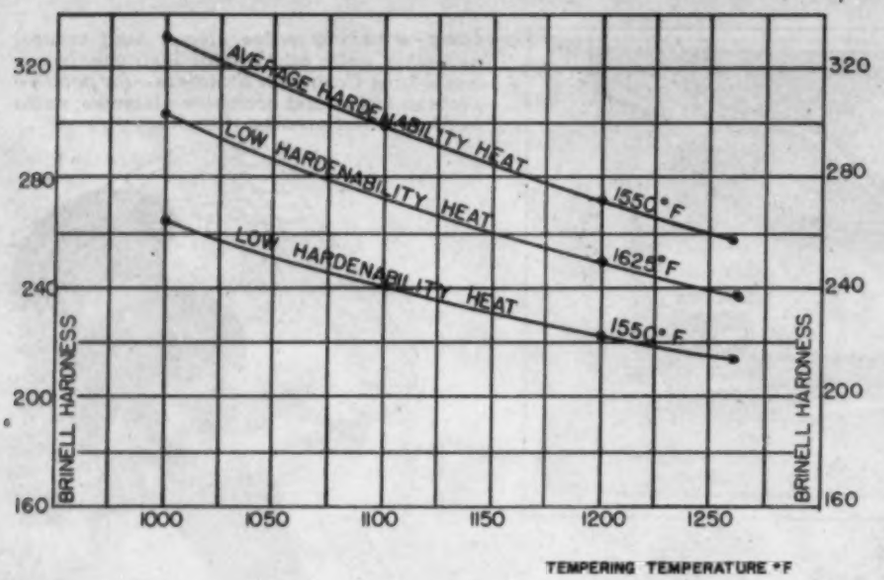


Fig. 7—Brinell hardness vs. quench and tempering temperature, 3-inch rounds, oil quenched

section can be masked during quenching or re-tempered in a bath.

When larger diameters are encountered, the familiar end effect becomes pronounced. This is illustrated by Fig. 2 which shows the hardness distribution across the diameter of a 4¾-inch quenched and tempered manganese-chromium-molybdenum steel at various positions. It is to be noted that the end slab No. 1 had much higher hardness than either of the other two. The heat had fairly good hardenability as indicated by the fact that sections No. 2 and 3 were practically identical.

Heats of lower hardenability will show much higher differentials. When brinell tests and even tensile bars are taken from heats of low hardenability, care must be taken to insure results corresponding to the central portion rather than the ends, particularly if the center portion is more highly stressed.

When heats of very low hardenability are encountered, it is sometimes possible to get a higher quenched hardness by increasing the quenching temperature. An experiment was conducted with two manganese-chromium-molybdenum heats—one with below-standard chemicals and consequently very low in hardenability, the other close to the upper limits. A "quench-out" test in water with small specimens gave the results shown in Fig. 3. Approximately the same results, except for a somewhat lower hardness, were obtained with small sections when oil quenched.

However, in sizes of 3 or 4 inches in diameter, a definite difference of approximately 80 brinell points hardness at various tempering temperatures was encountered. This difference could have been compensated for by reducing the tempering temperature but this was undesirable with batch loads including other heats.

An increase in quenching temperature from 1550 to 1625 degrees Fahr. raised the hardness sufficiently to enable pieces so quenched to be tempered with other heats. The results are plotted in Fig. 7: Full checks on the tensile properties and impact resistance showed good results as indicated by Fig. 6. It is to be noted that the impact at a 1625 degree Fahr. quench was slightly better than the 1550 degree Fahr. quench. The use of higher quench temperatures will often prove useful in securing results from heats low in hardenability which otherwise might not fit into a given set of production procedures.

Hardness explorations across "as quenched" bars were initially used to compare the hardenability of various heats. It was found, however, that in low hardenability heats the drop-off in hardness varied considerably between heats when tempered at the higher temperatures of 1000 to 1250 degrees Fahr. It was found necessary to draw at various temperatures and then make brinell explorations in order to obtain information useful for production. The Jominy end-quench method has proved particularly valuable since a plot of numerous heats when correlated with production performance for various diameters indicated various ranges which immediately illustrate the quality of heat for given production conditions. A Jominy plot of various ranges is shown in Fig. 8 along with various NE heats which would perform similarly. It should be realized that such plots can best function when based upon actual production since variables in heat treating processes, particularly the quenching media, greatly affect the ultimate results obtained by various plants.

Experience with Large Sections: Experiments were conducted for the last 8 years with a number of low alloy steels for large sections 10 to 20 inches in diameter in an effort to reduce the cost of such massive forgings. No attempt was made to get full hardness across the sections since only the gear tooth depth required the specified hardness. The results were satisfactory in regards to the metallurgical factors, although in all cases a water quench was required. This presented a problem since all smaller shaft ends or other extreme variations in sections required masking to reduce the danger of cracking. It was possible to secure tensile strengths of 115,000 to 140,000 pounds per square inch to the desired depth. Combinations of carbon and molyb-

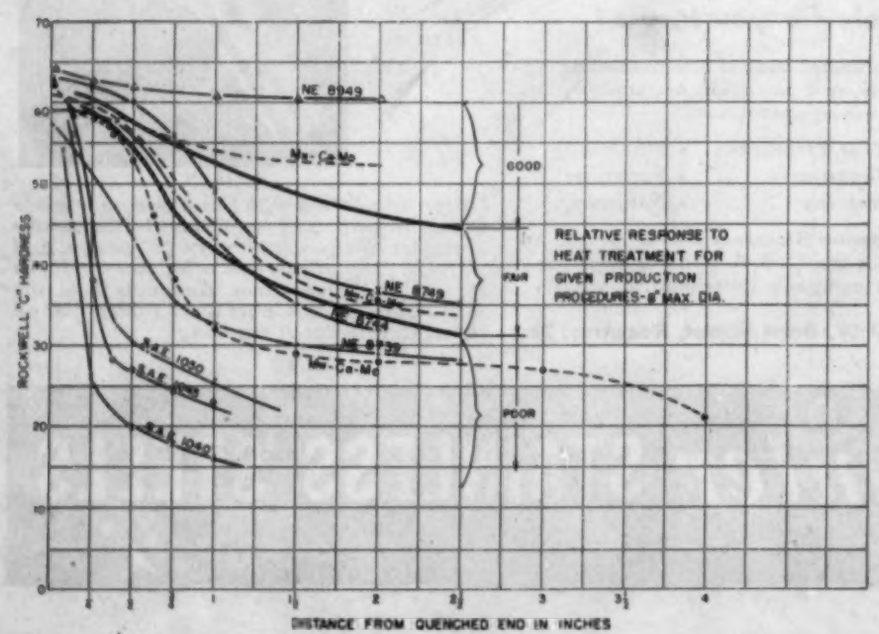


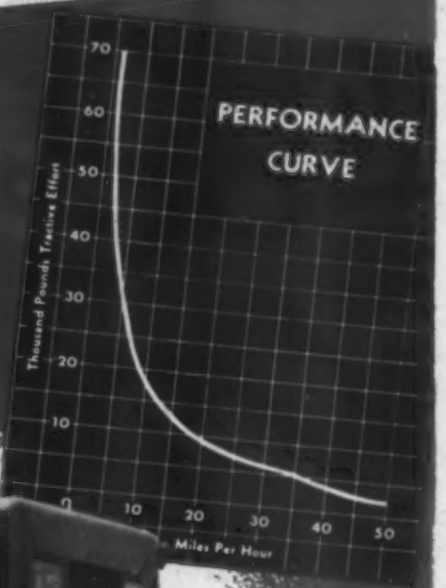
Fig. 8—End-quench hardenability curves compared

100 TON PORTER

650 H.P. DIESEL ELECTRIC SWITCHER

TWIN-POWERED FOR DOUBLE AVAILABILITY

Built for heavy yard, terminal and belt-line work, this newest 100-ton 650 horse power PORTER is in every sense a railroad man's switcher. Powered by two complete Diesel-Electric Units, it is equal to the toughest switching job, yet is versatile enough to be used for light work. Its two independent power plants insure constant availability and unlimited operating range. Complete specifications on request



ONLY *PORTER* BUILDS A *COMPLETE* LINE OF LOCOMOTIVES

H. K. PORTER COMPANY, INC.
PITTSBURGH PENNSYLVANIA

denum, chromium-molybdenum, etc., were tried. Uniformly, the main difficulty for gears involved poor machinability.

As an example, a quenched and tempered carbon-molybdenum 15-inch diameter pinion required three times the cutting time of an SAE-4340 steel normalized and tempered to the same physicals.

The hob wear was increased approximately 40 per cent even with the slower feeds and speeds. A higher quenching temperature was tried in an effort to effect complete solution of the carbides with but slight improvement.

Obviously, the increased machining time and decreased tool life of the expensive equipment used to produce accurate gearing easily nullified any economies resulting by the use of lower alloys. The lengthened gear cutting period could not be tolerated in times such as these.

Experiments with sulphurized steels of large sections were not particularly successful due to the inability to get good results in forging.

Experience would indicate that a sufficiently high alloy content to produce physicals of from 115,000 to 130,000 pounds per square inch by a straight normalize and temper are required to obtain good machinability for large gears and pinions. For shafts and similar items requiring less complicated machining, the lower allowed steels when liquid quenched and tempered are entirely satisfactory.

Here is an application requiring alloys not for the purpose of securing engineering properties, but mainly to obtain most desirable production characteristics.

The data presented here serve to illustrate that the use of lower alloyed steels has been tried and found practicable in many years of production and field experience.

The problems encountered are similar to those found by new users of the NE steels.

Cognizance must be given the fact that for a given section increased alloy contents exhibit the law of "diminishing returns" when the maximum hardness associated with the carbon content or required physicals have been secured. The problem therefore has always been one of adequate alloying which might be a low alloy but never the misnomer "lean alloy" if "lean" designates insufficient alloying to produce the desired results.

CARBON-MANGANESE STEELS

	C	Mn	Si
NE 1330	0.28-0.33	1.60-1.90	0.20-0.35
NE 1335	0.33-0.38	1.60-1.90	0.20-0.35
NE 1340	0.38-0.43	1.60-1.90	0.20-0.35
NE 1345	0.43-0.48	1.60-1.90	0.20-0.35
NE 1350	0.48-0.53	1.60-1.90	0.20-0.35

NICKEL-CHROMIUM-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 8613	0.12-0.17	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8615	0.13-0.18	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8617	0.15-0.20	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8620	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8630	0.28-0.33	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8635	0.33-0.38	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8637	0.35-0.40	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8640	0.38-0.43	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8642	0.40-0.45	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8645	0.43-0.48	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8650	0.48-0.53	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE 8720	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.20-0.30

SILICON-MANGANESE AND SILICON-MANGANESE-CHROMIUM STEELS

	C	Mn	Si	Cr
NE 9255	0.50-0.60	0.70-0.95	1.80-2.20	.....
NE 9260	0.55-0.65	0.75-1.00	1.80-2.20	.....
NE 9261	0.55-0.65	0.75-1.00	1.80-2.20	0.10-0.25
NE 9262	0.55-0.65	0.75-1.00	1.80-2.20	0.25-0.40

MANGANESE-NICKEL-CHROMIUM-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 9415	0.13-0.18	0.80-1.10	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9420	0.18-0.23	0.80-1.00	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9422	0.20-0.25	0.80-1.10	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9425	0.23-0.28	0.80-1.10	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9430	0.28-0.33	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9435	0.33-0.38	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9437	0.35-0.40	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9440	0.38-0.43	0.90-1.20	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9442	0.40-0.45	1.00-1.30	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9445	0.43-0.48	1.00-1.30	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9450	0.48-0.53	1.20-1.50	0.20-0.35	0.30-0.50	0.30-0.60	0.08-0.15
NE 9537	0.35-0.40	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9540	0.38-0.43	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9545	0.43-0.48	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9545	0.40-0.45	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE 9550	0.48-0.53	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25

CARBON-CHROMIUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE 52100A	0.95-1.10	0.25-0.45	0.20-0.35	1.30-1.60	0.35 max.	0.08 max.
NE 52100B	0.95-1.10	0.25-0.45	0.20-0.35	0.90-1.15	0.35 max.	0.08 max.
NE 52100C	0.95-1.10	0.25-0.45	0.20-0.35	0.40-0.60	0.35 max.	0.08 max.

Newly Revised NE Steel Compositions Are Listed

As mentioned briefly in STEEL last week, p. 37, the NE (National Emergency) steel listings have been revised to meet conditions surrounding the use of scrap in production of these steels. The revised list as issued by the American Iron and Steel Institute, New York, is shown in the accompanying table.

The NE-9400 series have had their silicon content reduced from 0.40-0.60 to 0.20-0.35 per cent. This change is said to be a benefit to the steel, particularly in heat treatment. The former high silicon was conducive to formation of "fisheyes," it is reported.

Chromium content in the NE-9400 series has been increased from 0.20-0.40 to 0.30-0.50 per cent while the nickel content has undergone a similar increase of from 0.20-0.50 to 0.30-0.60 per cent. It is questionable that these two increases can be judged as reflecting a somewhat easier situation in supply, rather it is believed to be due more to increases in scrap residuals due to great quantities of high-alloy scrap resulting from armor-plate operations and similar work.

Note also that new NE steels added include NE-9261, NE-9425 and NE-9545. Compositions discontinued include NE-8020, NE-8442 and the entire NE-9600 series. Chromium content of NE-9262 was revised to read 0.25 to 0.40 per cent.

This listing was published by the American Iron and Steel Institute under date of August 15, 1943, and supersedes the list carried in STEEL of March 1, 1943, on p. 98. For list of NE CARBON steels, see March 8, p. 90. For test of AMS (Aeronautical Materials Specification) steels, see Aug. 9, p. 92.

Many of these parts are less than one inch in diameter, the thin separations around their edges are reflected upon the screen at 22 magnifications, and inspected for perfect alignment.

Courtesy Westinghouse Electric & Manufacturing Company

INACCURACIES in Vital Airplane Parts are ELIMINATED by inspection with Jones & Lamson Optical Comparators

THESE small commutators for aircraft radio sets were examined with a magnifying glass until the Westinghouse Electric & Manufacturing Company installed **Jones & Lamson Optical Comparators** for the inspection of these parts.

Now they are inspected rapidly, positively and with less fatigue. Moreover, production was increased by 20 per cent.

Many other farsighted manufacturers have discovered the practical advantages of inspection by optical projection, after consulting Jones & Lamson inspection engineers. They are always ready to study your problems and make recommendations based on more than twenty years experience in this field.

Universal Turret Lathes . Fay Automatic Lathes . Automatic Thread Grinders . Optical Comparators . Automatic Opening Threading Dies

JONES & LAMSON MACHINE CO., SPRINGFIELD, VERMONT, U.S.A.

Profit-producing Machine Tools

GRINDING CARBIDE TOOLS

By W. L. KENNICOTT
Tool Engineer
McKenna Metals Co.
Latrobe, Pa.

Proper attention to a few important factors in grinding can greatly extend the life of carbide-tipped tools used for cutting steel

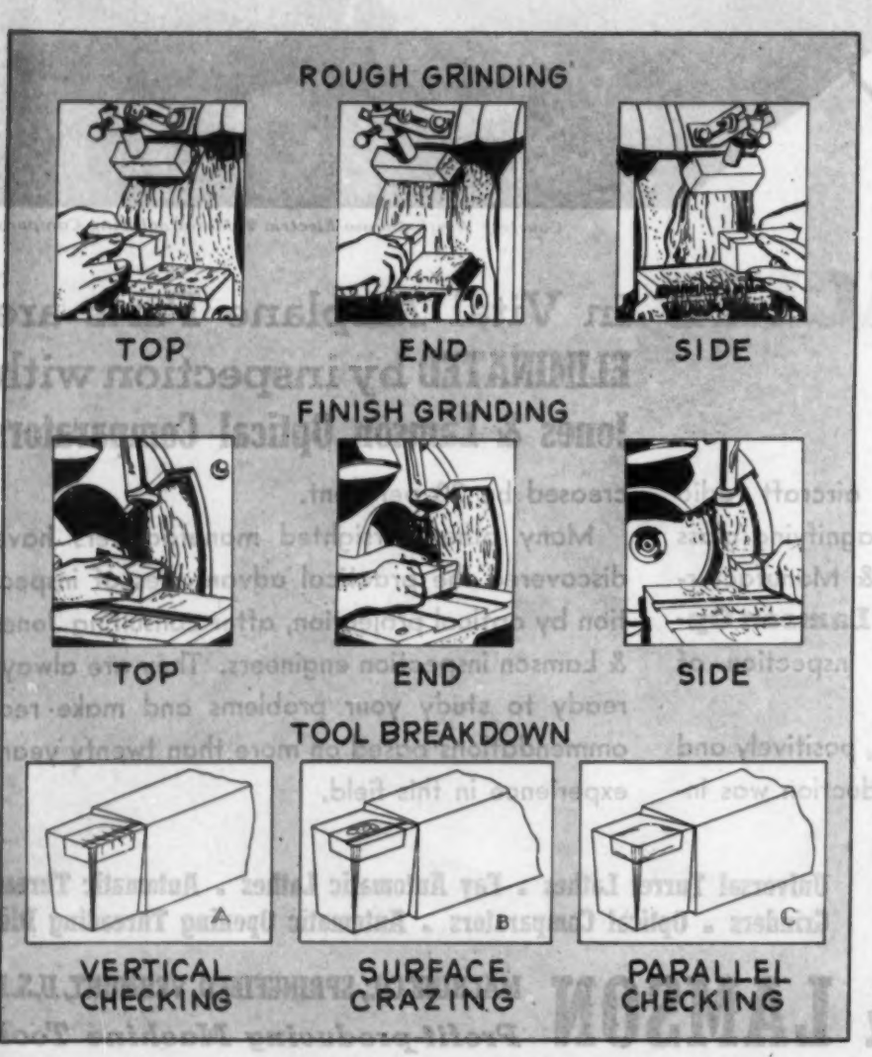
TO CONSERVE vital carbide-tipped steel-cutting tools, proper consideration should be given to methods of grinding. Improper grinding methods can produce structural weaknesses in carbide tips which are not characteristic of the cutting composition itself. This structural breakdown takes the form of cracks or checks in the carbide and often makes the tool appear inherently weak.

Carbide tools can be protected from breakdown on the job due to cracks or checks by wet grinding them properly when resharpening becomes necessary.

Avoid dry grinding methods whenever possible, particularly on tools larger than ⅝-inch square. If a quantity of tools can be ground at one time, it is possible to dry grind each one a short time and lay it aside to cool, but a great deal of time is lost and, frequently the urgency for getting a particular tool finished results in grinding it with insufficient cooling periods with the result that the tool is cracked or checked.

When cracked tools break down in a machine, the regrinding requires removal of considerable material instead of the few thousandths necessary in normal resharpening. The additional grinding further ties up the grinding room, and the heat put on the tool grinders often results in heat on the tools, further aggravating conditions. *In other words dry grinding is possible but not usually practical.*

In addition to eliminating tool damage from checking, wet grinding is faster than dry, permits the use of more durable wheels, and washes away abrasive dusts. Frequently wet grinding will eliminate a finish grind on large roughing tools since 80 or 100-grit wheels running under coolant produce a fine enough cutting edge for many jobs.



Rough Grinding

Rapid grinding is possible on large green or grey grit special loose-bond silicon-carbide wheels, using a water coolant with enough sal soda to make an alkaline solution and prevent rusting of the machine. A 60-grit soft-bond wheel of as large a diameter as possible should be used. A 20-inch diameter straight wheel is preferred for rough grinding the usual run of large tools such as are used in machining shell bodies and other ordnance work.

The coolant should cover the entire working face of the wheel and make contact with the wheel just above the tool. An ample flow should be provided, not a jet or spray. A spur wheel dresser should be used frequently to keep the new silicon carbide crystals exposed. An experienced operator can keep the wheel dressed with the tool being ground by maintaining a constant movement of the tool back and forth across the wheel as well as rocking the tool in both directions. Alternate light and heavy pressure should be used in order to break the silicon carbide crystals and thus maintain a sharp, free cutting wheel. The flow of water, hardness of the wheel bond, and other grinding conditions should be such that the tool, pulled rapidly away from the wheel while grinding, should not feel warm when touched with the finger.

To permit rocking the tool in all directions during the roughing operation, a narrow tool rest (approximately 1½ inches) should be used. This rest may be set at an angle about 2 to 3 degrees more than the clearance angle required, thus permitting a final pass over the wheel with the tool held on the rest to true up the angles for finished grinding.

Finish Grinding

A large cup wheel between 90 and 120-grit on a wet grinder is recommended for finish grinding steel-cutting carbide tools. Keep the tool moving back and forth across the wheel, since the large tool rest used to true up the angles does not permit rocking the tool. Dressing the wheel with about 1/32-inch crown in the center of the face will decrease the area of contact and permit

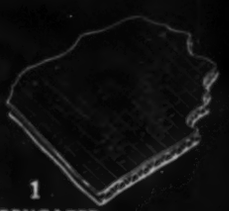
(*Please turn to Page* 154)

WIN A WAR BOND . . . tell why

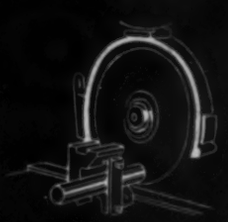
dag REG. U.S. PAT. OFF. COLLOIDAL GRAPHITE

IS IMPORTANT in the Manufacture or Use of Each of the 4 Items Illustrated

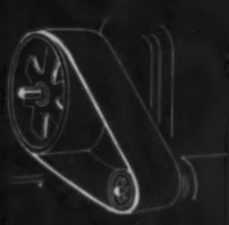
4 DIESEL ENGINE



1 CORRUGATED PAPER



2 ABRASIVE CUTOFF WHEEL



3 LEATHER DRIVE BELT

*dag Colloidal Graphite in the Electronics Industry

A graphite film formed from **dag** colloidal graphite is used on the inside walls of cathode ray tubes as a ray-focusing anode. Such a coating also serves to reduce light reflection from the glowing filament and because of getter properties it possesses, assures the maintenance of a high vacuum.

It is also possible to fabricate special non-metallic electrodes using mica discs carrying a graphite coating. In addition to being light and strong, they are non-magnetic and do not warp.

When the grids of certain types of receiving and transmitting tubes are treated with colloidal graphite, undesirable thermionic emissions are minimized.

Being resistant to electron bombardment, graphite coated tube parts do not readily emit secondary electrons. "Back" emission difficulties are likewise reduced since graphite films have little affinity for any particles that may be sputtered from activated filaments.

Coatings formed with certain **dag** dispersions are amply conductive to enable them to function as effective electrostatic shields. These are useful in connection with vacuum tubes, electronic musical instruments, special research equipment and the like.

Colloidal graphite may also be used for the production of both fixed and variable resistors. By altering concentration of suspension, method of application and subsequent treatments, it is possible to obtain a wide range of ohmic values.

These and numerous other applications for **dag** colloidal graphite in the field of electronics, are set forth in a new bulletin 432-AZ available free on request.

*A TYPICAL APPLICATION

How to Win

Acheson Colloids Corporation will give a $25.00 War Bond to each of the 5 people who submit complete and accurate answers together with the 5 best letters on the question, "Why is **dag** colloidal graphite important in the manufacture and/or use of each of the products pictured here?" (1) State business connections (no one in the graphite field or their families is eligible). (2) All entries must be legible. (3) All entries must state the publication in which the advertisement was seen. (4) Entries must be postmarked not later than October 15, 1943. (5) In case of ties, duplicate awards will be made. (6) Entries become the property of the Acheson Colloids Corp. (7) The verdict of the judges will be final.

dag COLLOIDAL PRODUCTS

ACHESON COLLOIDS CORPORATION

PORT HURON MICHIGAN

These are two more of the War Bond Winners. Others will be introduced in subsequent issues.

Mr. Fred. E. Schubert, Chief Engineer, Operation and Maintenance of the 20000 KW Municipal Power Station, Columbus, Ohio.

Mr. Edward Littlejohn with The General Engineering Company (Canada) Limited, Toronto, Canada.

Cantilever Bar Increases

FLAME-CUTTING OUTPUT

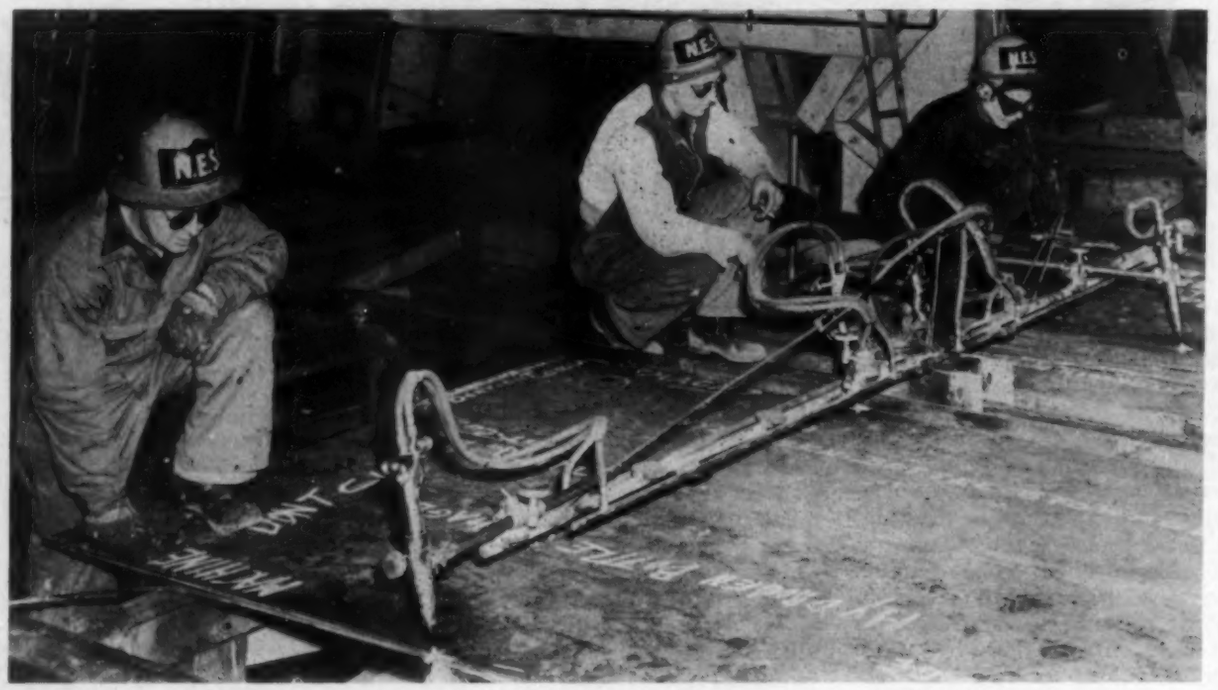
A device for multiplying the productive output of a portable flame-cutting machine is now in use in a New England shipyard, accomplishing in a single stroke the work normally produced by two or more machines.

As shown in accompanying illustration, this attachment consists of a 10-foot bar balanced crosswise on an Airco No. 4, Radiagraph, supplied by Air Reduction Sales Co., New York, with the ends supported cantilever fashion by turnbuckled rods welded at the apex to a vertical plate section. The four torches are in adjustable positions for trimming parallel edges simultaneously on two plates, one on each side of the machine tracks.

The 40-foot track is laid in the trough of several sections of structural channel welded end-to-end. Cumbersome lengths of gas hose are eliminated by the use of gas pipes mounted parallel to the torch bar. Four round mounting pads are welded at intervals on each side of the bar so the torches can be fixed in any position along the bar, making possible fine adjustments by means of the rack and handscrew supporting each torch.

Not only is linear cutting quadrupled by this device, but plate edges are cut parallel with maximum accuracy. The secondary benefit obtained from this is a more precise fitup in assembly, with consequent faster welding of butt joints.

Three operators are required to maintain torch adjustment, but on regular production work the machine has produced 1240 linear feet of cutting in 8 hours. The average for a single machine at this shipyard is 300 feet per 8-hour shift.



Relates Advantages of White Cement Floor

Lighting on underside work surfaces is increased by 61 per cent and on vertical work surfaces by 20 per cent, according to the booklet, "Light from Floors Speeds War Production" published by Universal Atlas Cement Co., Chrysler building, New York, in describing a new type of light-reflecting floor now being used by many aircraft plants.

Built of concrete made with white Portland cement instead of gray cement or other darker materials, the light-reflecting floors become giant reflectors instead of giant absorbers of light, states the publication. This in turn increases illumination and helps increase production, reduce accidents, boost morale and preserve health.

Examples in the book show how a white cement floor compared with a gray floor in the same plant reduces shadows and dark areas and promotes visibility by reducing the contrast between the visual task and the surrounding background.

Seeks Acceptance of Bolt Packaging Practice

Simplified form of practice recommendation R60-30, "Packaging of Carriage, Machine and Lag Bolts," is now being circulated to all manufacturers of bolts, associations and other interested groups for acceptance according to the Division of Simplified Practice, National Bureau of Standards, Washington.

Revision of the practice was recently planned and consummated by the Standards Committee of the Division of Simplified Practice in collaboration with a like body of the American Institute of Bolt, Nut and Rivet Manufacturers.

Original practice of packaging these items was drafted in 1927, then later revised in 1930. Copies of the proposed revision are available, upon request, from the Division of Simplified Practice.

What are you *doing* about *Planning*?

MOST everyone is *thinking* about planning ahead. But it's what you are *doing* about planning that will count in your favor —and in favor of your company, in the postwar years.

Planning can*not* be left until the end of the war. By that time industry must be prepared to go all out for peacetime products, as it is now going all out for maximum war production. Success in achieving satisfactory postwar goals, depends upon our preparedness to speedily reconvert manufacturing, engineering and distribution facilities the moment the opportunity arrives.

To *do* something about planning, *more* and *better* information is needed. For months STEEL has been gathering and publishing such information for the metalworking and metal-producing industry. Examples are, the series of 10 articles on "Postwar Planning", prepared by E. C. Kreutzberg, Editor, and Art Allen's searching analysis of "The Postwar Automobile". (Both are available in booklet form on request.)

STEEL's postwar planning program is under the direction of a full time *planning* editor who has the cooperation of *all* of our editors and correspondents. The information developed is being made available to metalworking management through the pages of STEEL.

If your responsibility is sales or advertising to metalworking markets, watch STEEL from week to week for this special postwar planning information. As a further aid to you, we have prepared a brief analysis of the major postwar problem confronting business; a sales quota planning chart which you can use to project your sales in relation to the industry; and a check list of postwar planning projects. Ask STEEL's representative for copies.

STEEL

The Magazine of Metalworking and Metalproducing · Cleveland 13, Ohio

CHROMIUM PLATE

Its Thickness and Finish Requirements

By T. G. COYLE
Technical Director
United Chromium Inc.
New York

THE RECENTLY accepted ASTM "Tentative Recommended Practice for Chromium Plating of Steel for Engineering Use" (B 177-43 T) outlines quite completely methods and operating conditions for electrodepositing chromium directly on steel. The details of the procedure and operating techniques there described may be considered to apply to chromium plating on steel generally, without special reference to the type of article to be plated, or to the particular function the chromium plate is to perform.

It should not be concluded from this, however, that all steel articles are chromium plated alike; on the contrary, for best results different applications require different thicknesses of deposit, and some require special plating conditions and finishing treatments.

Use of Article Determines "Plate"

The purpose here is to give information on such requirements, and to treat more specifically some of the commonly used applications. In short, the information given here on "how much plate" is intended to complement the recommendations on "how to plate" as outlined in tentative recommended practice B 117 mentioned above.

While a great amount of testing in both field and laboratory has been carried out on the various applications of chromium plate on steel, no attempt is made here to describe these tests or to include test data. The recommendations on plate thickness and plating conditions or plate treatment are based principally on experience in the field over many years and represent the most commonly accepted practices.

As will be apparent from the following, setting up complete specifications on chromium-plate applications for engineering use is hardly practicable. *Thickness and finish requirements vary not only from one class of service to another, and from one class of articles to another, but even among different articles in the same type of service.* Conditions of service, such as load, abrasion, temperature, and corrosion, not uncommonly differ for the same class of article and require diverse amounts and treatments of plate.

Pump rods, for example, working in different type wells, some under severe corrosive conditions, others under severe abrasive conditions, might require different handling for the different service conditions; or drawing dies and plugs on different drawing operations might require different thicknesses of deposit for best results in each case.

Other Factors To Consider

Conversely, the condition of the article itself as to size, shape, or construction might dictate the kind of finish or the amount of plate to be used. An example here is a cylinder, or a gage, worn oversize or out of round, thereby requiring a heavier plate or a different method of processing than would otherwise be recommended.

Each application is, in varying degree, an individual problem. The information in the following on plate thickness values and plating conditions or finishing treatments should be considered in this light, and taken as a general guide, with any individual case possibly requiring a departure from the recommendations given.

Wear-Resistant Applications: Most applications of chromium plate on steel for engineering use are made primarily to obtain better abrasion resistance and to decrease wear on the plated article or part. Into this category fall most tools, cutters, gages, dies, and machine parts, as well as bearing surfaces, printing surfaces, rods, plungers, and similar equipment.

Plug gages, ring gages and other gages of various types are generally finished with a chromium plate 0.001 to 0.0015-inch thick. Beyond giving a deposit of sufficient thickness to withstand the load and pressure of the gaging operation, the object is to have a deposit of thickness greater than the wear tolerance of the gage. In this way a chromium surface is maintained throughout the accuracy life of the gage, and at the same time the underlying steel basis metal is protected from wear or scoring or other damage so that the gage can be resized very easily by dissolving ("stripping") the remaining chromium and replating the gage. This practice, it should be noted, also applies to many of the other applications discussed below, in particular drawing dies and materials, many machine parts and certain tools.

Advantages of Thin Plating

In some gaging operations where tolerances are extremely small or the gage must have a sharp working edge, the chromium plate thickness should be only of the order of 0.0001 to 0.0003-inch. The purpose here is to avoid chipping or spalling of the plate that might occur on the sharp edge if heavier deposits were used. The thinner deposits, even though they may afford lesser increase in number of gaging operations than the heavier plate, still give the advantages of the chromium working surface, and are desired for this reason as well as for protection of the steel and the resizing practice the plating makes possible.

In practice, the usual procedure is to grind the gage undersize by the amount of plate thickness required, plate oversize by an amount sufficient to give grinding stock, and finally grind or lap back to gage size, leaving a finished chromium deposit of the required thickness.

In cases where the thin (0.0001 to 0.0003-inch) deposits are used, the gage

(*Please turn to Page* 145)

From a paper presented at meeting of the American Society for Testing Materials, Philadelphia, June 28 to July 2, 1943.

CURTAINS OF SMOKE that mean "Curtains" FOR THE AXIS!

ON battlefronts all over the world, United Nations troops are advancing upon and capturing the strongholds of the enemy. The quick and successful completion of many of these advancing actions, with a relatively small loss of men and equipment, is due to a protective missle—unique in land warfare—the smoke shell. Fired from tanks it lays down a curtain of smoke similar to the smoke screens used in naval engagements—affords infantry and armored units vital protection in carrying out strategic maneuvers.

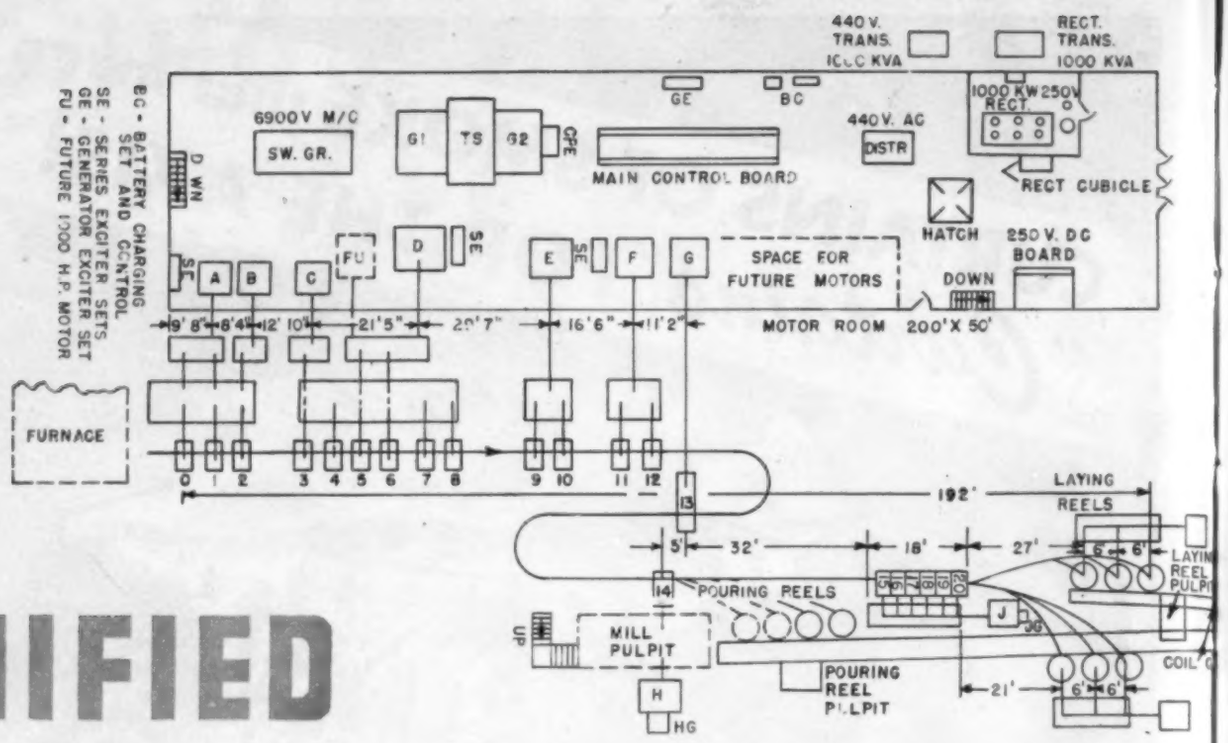
The latest and most efficient types of this aid to our fighters are made of light wall WELDED STEEL TUBING. They are more efficient because this method of tubing fabrication permits increased packing volume, with consequent greater screenage per pound of projectile.

WELDED STEEL TUBING is being employed to advantage in a host of other war items. We're making many of them. If you are manufacturing a product that has a tubing problem—if you need an additional source of supply or wish counsel on how WELDED STEEL TUBING may help you to do a better, quicker job—get in touch with us. We will gladly cooperate in every way we can.

THE STANDARD TUBE CO.

Detroit STANCO Michigan

Welded Tubing Steel Forgings



UNIFIED DRIVES

INCREASE ROD MILL PRODUCTION

By F. R. GRANT
Steel Mill Division
and
G. L. BEAVER
Sales Engineer, Pacific District
General Electric Co.
Schenectady, N. Y.

ANOTHER step has been achieved in the war expansion program with the completion and full-time operation of the Columbia Steel Co.'s new continuous rod mill at the Pittsburg, Calif. works. Operation of this mill, the most modern continuous type built for 3-strand rolling in the United States, materially adds to the finished steel facilities in the Pacific Coast area.

At this mill, rods produced from billets, 30 feet long and weighing 600 pounds, pass through the last finishing stand to the reels at the rate of 48 miles per hour. At this speed, from one 600-pound billet, a No. 5 rod nearly a mile long is delivered to the reels in about a minute from the time the billet leaves the suspended-arch type heating furnace.

Operation at this mill, which furnishes rods to Columbia's adjacent wire mill, is continuous from the time the cold billet enters the furnace until the bundle of finished rods is placed on the shipping platform at the end of the mill. These 30-foot rods are fed one by one into the upper end of a 33 x 50-foot furnace which has an hourly heating capacity of 50 tons of billets, thus insuring a steady flow. All steel-heating operations are automatically controlled from fuel mixture ratios to the temperature of the heated billet.

Billets are heated slowly and uniformly until they reach the proper rolling temperature. Then they are pushed out from the lower end of the furnace into the "bite" of the rolls of the first of nine roughing stands.

The mill, as shown in Fig. 1, comprises a total of nine roughing stands, Nos. 0 to 8 inclusive; six intermediate roughers, Nos. 9 to 14 inclusive and, six finishing stands, Nos. 15 to 20 inclusive, for rods. Three strands of steel can be handled simultaneously through the entire mill. An interesting operating feature lies in the fact that steel from one billet is being rolled in all of the 21 stands at the same time. When the leading end of the rod being rolled emerges from the last stand, approximately two-thirds of the original billet still remains in the furnace, and has not yet entered the first stand.

Nine adjustable-speed, direct-current motors, A to H inclusive, and J, are used for driving the mill stands. This sectionalized drive is in marked contrast with the drives used for older types of rod mills, which were driven by single-speed, large capacity, alternating-current motors through a system of line shafts and gearing. By dividing the mill into a number of units, each with its individual direct-current motor, it is possible to change the speed rela-

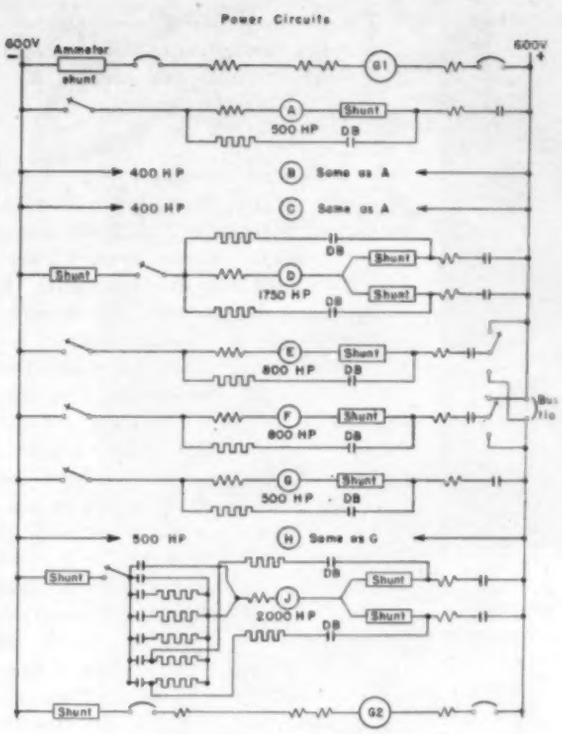


Fig. 1. (Opposite page) — Rod mill layout showing location of roughing, intermediate and finishing stands

Fig. 2. (Immediate left) — Principal circuits of main motors and 600-volt generators

tionship between the various stands quickly and easily, thus permitting a greater variety of products and more easy operation of the mill. The wide range of rolling schedules made possible by this flexibility in control is one of the chief advantages of the sectionalized type of drive.

Provision is made to feed the rod automatically into each successive stand and into the reels, thus entirely eliminating manual manipulation of the hot materials. Fig. 3 shows the intermediate section of the mill in which the repeaters between stands Nos. 12 and 13 and Nos. 13 and 14 are located. Following stand No. 14, the mill is arranged so that the output of this stand may be sent either directly to the pouring reels when reeling the heavier rod products, or to stands Nos. 15 to 20, inclusive, for further reductions and ultimate delivery to the laying reels when rolling rods of smaller diameter.

After leaving the final finishing stand, the rod passes through water-cooled connecting pipes to the reels. From the reels, the bundles of finished rods are switched onto an apron conveyor and headed toward the loading platform. At the end of this conveyor, the bundles are transferred automatically to a hook-carrier conveyor, designed to cool the rods before handling.

Rod bundles are removed from the hook conveyor by manually-operated air hoists and placed on stands. Groups of coiled rods are then picked up from the stands by tractors and loaded on specially constructed flat cars for transfer to the wire mill.

Mill Is Separate Unit

The rod mill is a complete unit separate from the rest of the rolling mills and is served by its own auxiliary equipment. The roll shop for shaping and renewing the rolls is entirely modern in every respect. Seven of the nine main drive motors are housed in a separate motor room, which is air-conditioned to remove the heat of the motors and to protect them from dust and other abrasives in the air. A water recirculating system is provided, made up of a settling tank, a clari-floculator tank, a cooling tower, and suitable pressure pumps for returning the water to the mill, so that only make-up water is required.

A quick roll change feature of the rod mill is the conventional type of wobblers with the innovation of built-in universal drives on the coupling boxes and spindles, which minimizes loss of time for roll changes, and provides smooth, vibrationless running of the mill.

Mill rolls are being carried by fabric and ball thrust bearings adapted to the requirements of the job according to the most recent experience in rolling mill equipment. The size of the rod ordinarily produced in the mill is No. 4½ gage, but the mill is capable of producing No. 5 gage up to and including 1-inch coiled rods.

Electric equipment for this mill was supplied by the General Electric Co. Main drive motors, which are of the ad-

Fig. 3. (Left below)—Three strands of rods being looped from continuous roughing stands into semicontinuous intermediate stands

Fig. 4. (Right)—Motor room showing mill motors, main motor-generator set, main control board and related equipment

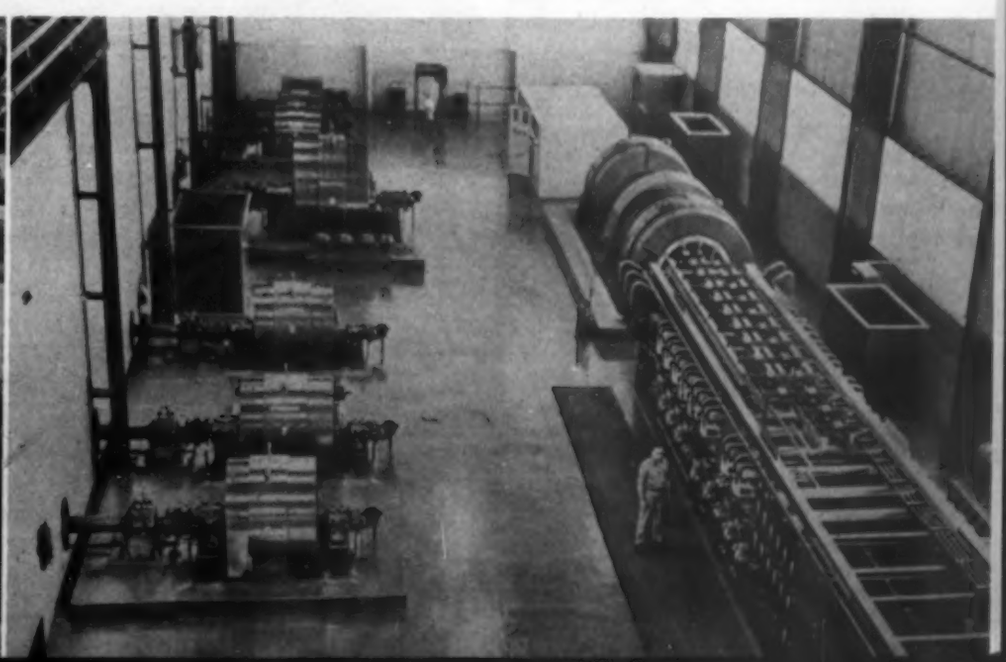


Fig. 5—Main control pulpit. Operator has view of entire mill in controlling its speed and keeping it synchronized

justable-speed mill type and which are for operation at 600 volts, are as follows:

Mill stand	Motor	Horsepower	Revolutions per minute
0-1	A	500	250/750
2	B	400	250/750
3	C	400	250/750
4-8, incl.	D	1750	150/450
9-10	E	800	300/900
11-12	F	800	300/900
13	G	500	225/625
14	H	500	225/625
15-20	J	2000	450/690

The mill motors are operated from two 2500-kilowatt, 600/450-volt generators, one of which normally supplies power from the first four motors and the other, normally, for the last three motors. Provision is made for supplying motors E and F, either one or the other, or both, from either generator. These generators and a 150-kilowatt, 250-volt exciter, are driven by a 7200-horsepower, 0.8 power factor, 514-rpm, 6600-volt, 3-phase, 60-cycle synchronous motor, forming a 4-unit motor-generator set. The 150-kilowatt, 250-volt exciter supplies excitation for the main roll motors and for general control purposes.

Speed Regulation Provided

All of the motors have separately excited main fields and separate auxiliary windings on the main field poles. In order to obviate as much as possible variation in speed of the rolls the auxiliary fields are energized from series-compound exciters, designed to maintain a speed regulation of not more than 1½ per cent variation from full load to friction load.

Motors as well as the generators are designed for continuous operation as open machines at rated loads with a temperature rise of the windings not exceeding 40 degrees Cent. They will also carry momentary loads of 200 per cent at any speed up to 200 per cent of base speed and 175 per cent load momentarily from 200 to 300 per cent base speed.

For furnishing 250-volt, direct-current power for cranes and mill auxiliaries, a 1000-kilowatt, 250-volt ignitron, single-anode, multiple-tank, mercury-arc rectifier is used. For supplying 440-volt, 3-phase, 60-cycle, alternating current for miscellaneous small constant-speed drives, a 1000-kilowatt ampere 6600/480-volt, 3-phase, oil-cooled transformer is installed. This transformer and the rectifier transformer are both located just outside the wall of the motor room adjacent to the 440-volt distribution switchgear and rectifier.

A general view of the motor room is shown in Fig. 4. In this room, 200 x 50 feet, are placed mill motors A to G, inclusive, for stands Nos. 0 to 13, inclusive, the main motor-generator set, the 6600-volt, metal-clad alternating-current switchgear, the main control board, and switchgear for the 440-volt alternating-current and 250-volt direct-current feeder circuits. The main control boards provide control facilities for the 660-volt, direct-current generators and motors and their related exciters, as well as for the control of the 440-volt alternating-current motors. Also installed in the motor room are various smaller motor-generator sets, such as the 3-series exciter motor-generator sets, the generator field exciter motor-generator set, and a small battery-charging motor-generator set.

In the basement of the motor room are placed generator and motor field rheostats, the starting reactor for the 7200 horsepower synchronous motor, the mill stand motor dynamic-braking resistors, the battery, and the ventilating equipment.

Air from the motor room is taken into the main generators at the commutator end, discharged through covers at the rear end, whence it is drawn through surface air coolers by two 29,000-cubic feet per minute motor-driven blowers and discharged into the basement. It is then sent back to the motor room through air ducts. Similar facilities are provided for the mill stand motors. The capacities of the various fans and surface air coolers are varied to suit the capacities of the related motors and generators. This arrangement follows the conventional down-draft system of ventilation. The motor room as well as the basement is constructed to prevent excessive leakage, so that only a minimum quantity of make-up air is provided. With the entrance cooling water 80 degrees Fahr. the air is discharged from the coolers at a temperature not exceeding 90 degrees Fahr. The synchronous motor driving the generators is provided with enclosing covers and corresponding appropriate facilities for forced-ventilation. Motors H and J driving stand No. 14 and the finishing train are located in the mill proper. They are provided with enclosing covers and each is supplied with cool air by a motor-driven fan in a closed, self-contained, recirculating system with surface air-coolers.

Connected to the armature shafts of motors H and J are direct-current generators for supplying power to motors driving the reels. Generator HG on motor H is rated 18.8/52 kilowatts and operates the two adjustable-speed pouring-reel motors, each of which is rated 25-horsepower. Motor J drives a 32.6/50-kilowatt generator JG which supplies power to two 20-horsepower adjustable-speed motors driving the six laying reels. In this manner the reels automatically follow any speed variations of the drives H and J.

Control and Switchgear Equipment

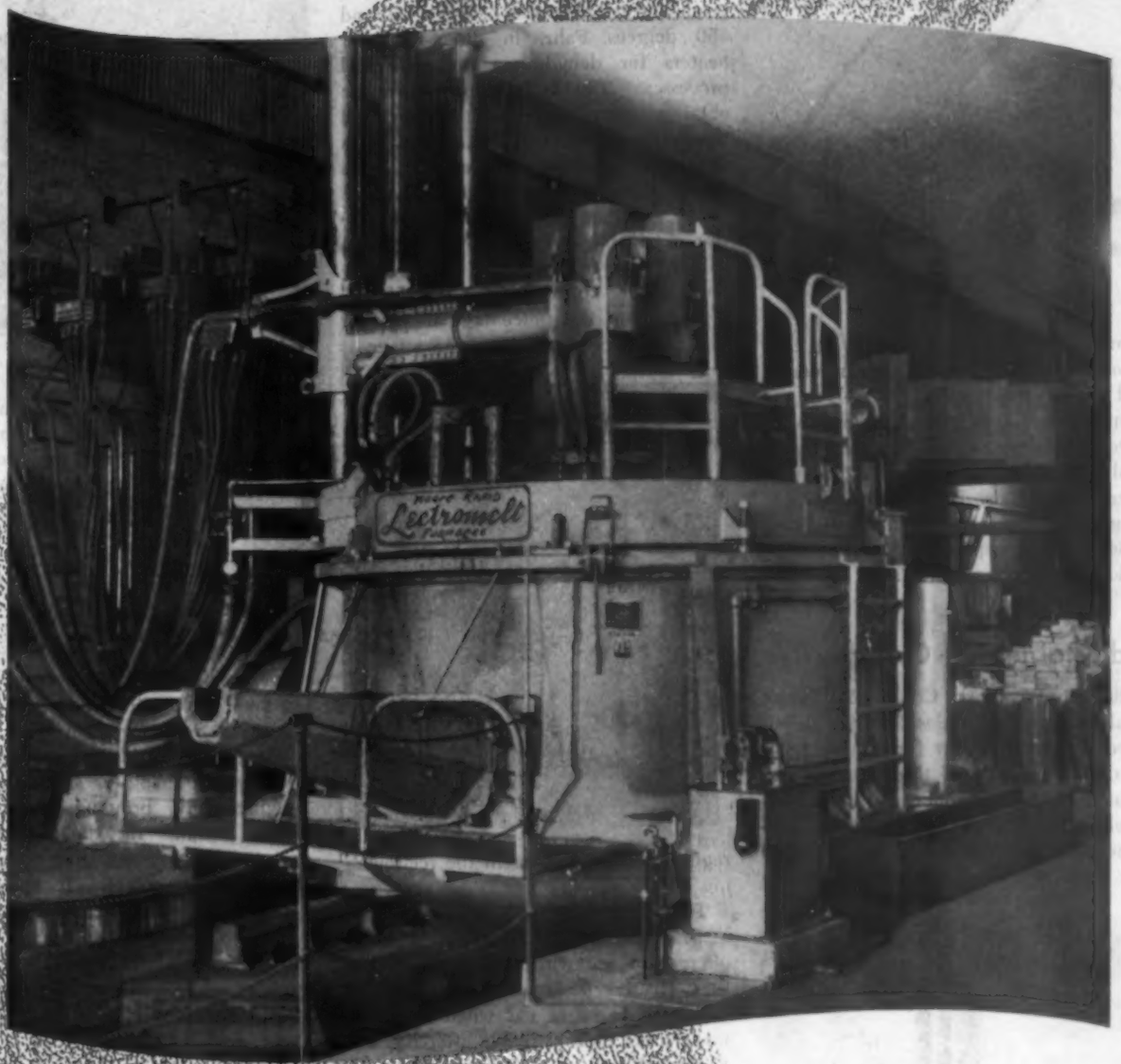
Power is brought to the metal-clad switchgear in the motor room at 6600 volts, 60 cycles, and is controlled by oil circuit breakers of 500,000-kilowatt amperes interrupting capacity. The 7200-horsepower synchronous motor of the main set is started at reduced voltage by the conventional starting reactor. The metal-clad switchgear is shown in the background at the right in Fig. 4, with all instruments, relays, and control switches mounted on hinged front doors, thus minimizing the conduit, wiring, and installation costs.

The principal circuits of the main motors and the 600-volt generators are

(*Please turn to Page* 151)

Outstanding...

In the Production of War Steels



Lectromelt furnaces—for the efficient melting of plain carbon and alloy steels for ingots, and castings, and gray and malleable irons.

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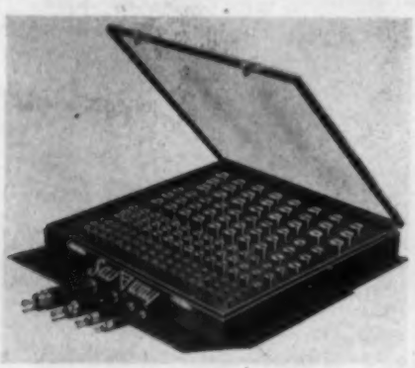
PITTSBURGH, PENNA.

ARMY E NAVY
MOORE RAPID *Lectromelt* FURNACES

INDUSTRIAL EQUIPMENT

Plug Gages

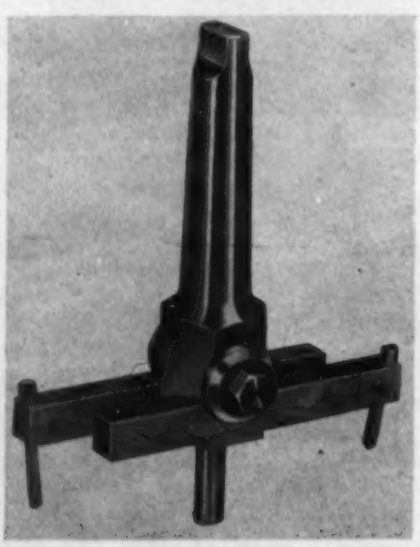
Sav-Way Industries, 4875 East Eight Mile road, Detroit, announces a master set of standard plug gages for hole inspecting. They are set in increments of 1/64ths, starting at ¼-inch and going to



1 inch. There are three plugs of each nominal size—0.0005-inch over, standard, and 0.0005-inch under. All plugs are deep frozen before finish grinding to relieve internal strain and provide accelerated aging, and are held to gage makers' tolerance lap finish. The set includes 147 plugs and 4 handles in a plastic case which has a transparent cover permitting a clear view of the contents.

Adjustable Fly Cutter

Robert H. Clark Co., 3424 Sunset boulevard, Los Angeles 26, has developed a new fly cutter for cutting holes or disks in metals of thicknesses up to 1 inch, including boiler plate, stainless steel and cast iron. The tool provides a generous clearance between work and the body of the cutter, making possible



deeper cuts with less strain on the tool. The cutting technique eliminates chatter and assures clean holes. It is being made with straight or tapered shank and covers expansions of 4 to 10 inches in diameter, including all decimal or fractional intermediate sizes.

Air Heater

Dravo Corp., 300 Penn avenue, Pittsburgh, recently introduced a method for producing temperatures between 150 and 350 degrees Fahr. in direct-fired air heaters for dehydration and chemical processes. The high temperatures are obtained from heaters with carbon steel combustion chambers, by means of a recirculating device. Its action allows heated air to be fed back to the heater's intake, so that the normal temperature rise obtainable by wiping air around a carbon steel fire box will produce any temperature up to 350 degrees Fahr., according to the percentage of the air that is recirculated. The percentage is

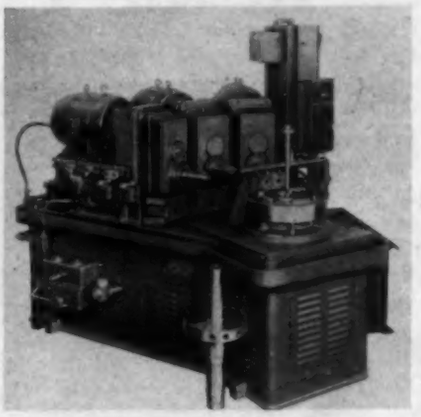
regulated by a damper in the recirculating duct.

The method is now incorporated in a new Dravo heater which is being offered for use with oil, gas or coal as fuel. Heaters designed for coal can be converted to oil or gas when conditions make these fuels available after the war. Saving of fuel as a result of high efficiency of heat abstraction and negligible radiation losses; quickness and flexibility of the installation are some of the heater's features.

Drilling Machine

Tripling production on aircraft part operations is accomplished by use of an automatic cycle machine which drills 15 holes, equally spaced around an extended pan on a forged aircraft propeller shaft. This machine, designed and built by Snyder Tool Engineering Co., 3400 East Lafayette, Detroit, is a horizontal three-way hydraulically-operated drilling machine with three drill heads, each with individual hydraulic feed cylinder. The three heads are geared together for single electrical control.

Operation is automatic and continuous until all 15 holes have been drilled. Index mechanism is electrically synchron-



ized and after five indexes, the machine stops for unloading and reloading.

Hydraulic equipment is housed in the welded steel base, and coolant is contained in a separate tank and trough at the side of the machine.

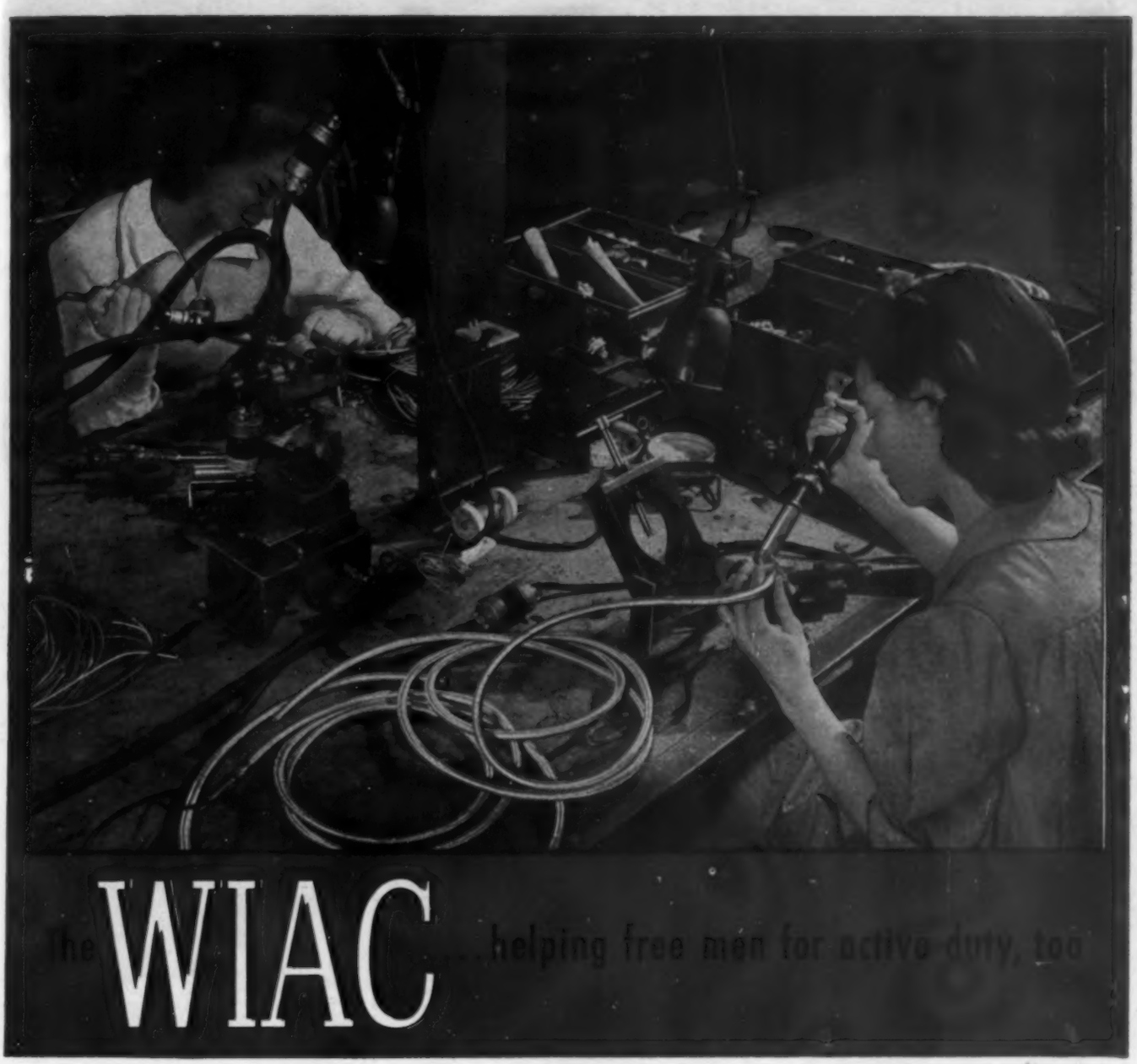
Elevating Table

Lyon-Raymond Corp., 1261 Madison street, Greene, N. Y., has incorporated improvements in the Lyon hydraulic elevating table for use in handling dies, locating work in convenient positions for welding, transferring heavy parts from one level to another, supporting overhanging work, bringing work to convenient heights for the operator, and operations where easy foot-actuated elevation is convenient. It operates advantageously with all loads up to its maxi-

mum capacity of 2000 pounds.

The table top is 30 inches square, having a lowered height of 29 inches, an elevated height of 43 inches, and an elevation of 14 inches. Standard stock table

(All claims are those of the manufacturer of the equipment being described.)



When considering the important contribution that women are making towards the war effort, don't overlook the Women's Industrial Auxiliary Corps.

Like their sisters in the service auxiliaries, these women workers in practically every type of war plant are today doing many of the "tremendous trifles" so important to all-out war production.

Here, American Flexible Low-Tension Shielded Conduit is being made ready for final assembly into a medium bomber built by a prominent Eastern plane builder. Threading electrical wires through the conduit and soldering on end connections was formerly done exclusively by men. Today, however, with a minimum of training, women are doing the job equally as well, and in many cases, faster.

Flying with our bombers is only one of the important jobs assigned to American Metal Hose products. In industry, various types of American Flexible Metal Hose and Tubing convey water, gas, steam and oil; it's also used in vacuum service for removing filings and dust; as misalignment connectors or for absorbing vibration in pipe lines—to name but a few applications where these products serve with distinction.

When you have an application requiring metal hose or tubing, regardless of its nature, we invite you to "go American." For in the American line there's one than can probably help you do the job just a little bit better. Our Technical Department will gladly assist with your particular problem.

AMERICAN METAL HOSE BRANCH
OF THE AMERICAN BRASS COMPANY
General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada:
Anaconda American Brass Ltd., New Toronto, Ont.
43203

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American Metal Hose

BUY ALL THE BONDS YOU CAN AFFORD . . . TURN IN ALL THE SCRAP YOU CAN FIND

Prompt Delivery!

ON THESE WESTINGHOUSE WELDERS

Need a-c or d-c arc welding machines? Westinghouse offers any of the models shown on this page for *immediate delivery*.

Westinghouse A-C Arc Welders boost welding speeds from 15 to 30 per cent . . . because arc blow is eliminated; heavier electrodes can be used; no "time-outs" for maintenance are necessary.

Westinghouse D-C Flexarc Welders, with new Arcontrol, are the favorite of welding engineers and operators everywhere. Just one simple adjustment gives the welding current desired . . . and Arcontrol offers choice of three types of arc.

For quick delivery or more information, call your Westinghouse distributor or Westinghouse office.

J-90477

FOR HEAVY-DUTY, PRODUCTION WELDING

A-C Welder Model WC-3C—500 amperes. Infinite number of current settings from 100 to 625 amperes.

FOR HEAVIER THAN AVERAGE WORK

A-C Welder Model WC-2C—300 amperes. Infinite number of current settings from 60 to 375 amperes.

FOR ALL-PURPOSE WELDING

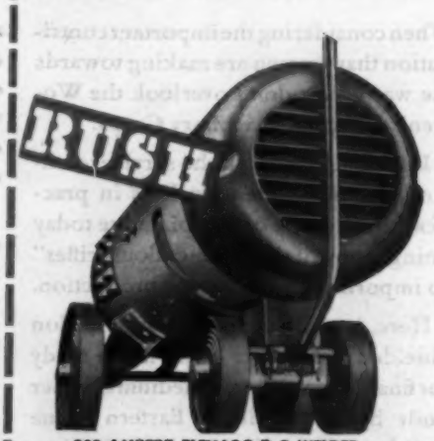
A-C Welder Model WT-4C—200 amperes. Has 27 different current settings from 20 to 250 amperes.

FOR MAINTENANCE AND LIGHT WORK

A-C Welder Model WT-1C—100 amperes. Has 15 current settings from 20 to 140 amperes.

FOR UNIONMELT* WELDING

Westinghouse A-C Welders for use with the Unionmelt Process available in 500, 750, 1,000 and 1,500-ampere models.



300-AMPERE FLEXARC D-C WELDER

New single preset current adjustment plus ARCONTROL. No exciter, rheostat or reactors to fiddle with.

*Registered trade-mark of The Linde Air Products Co.

Westinghouse WELDERS

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

can be furnished with the following optional features: A floor lock to keep table from moving on its casters; a spring balanced towing handle; locking device which allows table top to be turned and locked each 15 degrees throughout the entire circumference; collapsible retaining bars for table sides to hold work on table; four swivel casters; stationary unit with feet in place of casters; a two-speed hydraulic foot pump substituted for the single-speed pump, giving double speed with lighter loads. Special tables also can be furnished with other features, including different capacities, sizes of table top, lowered and elevated heights.

Improved Projector

A larger beam of parallel light, permitting the use of larger diameter lenses in the low-power series is the feature of a new model Wilder projector introduced by George Scherr Co., 128 Lafayette street, New York, recently. Use of a 2-inch diameter condenser in the unit greatly increases the optical efficiency of the instrument.

An innovation of the instrument is a

newly designed, fully enclosed head, with a more modernized and better ventilated lamp housing. For maximum smoothness of operation, spiral gears are used in the focusing motion. The setting thus becomes self-locking to a certain extent. Lenses of the projector are set in larger and heavier mounts. This facilitates changing and proper positioning in the lens cone. The diameter of the new 10X lens is 1⅜ inches and that of the new 20X lens 13/16-inch.

Precision Grinder

Increased work production, greater accuracy and finer finish are features of a new type B 10-inch plain cylindrical automatic precision grinder recently placed on the market by Fitchburg Grinding Machine Corp., Fitchburg, Mass. It is designed to handle a wide range and a number of types of jobs.

The new grinder is equipped with a fixed standard bowgage wheelhead unit. The bowgage head goes through a completely automatic cycle—rapid traverse to the work, correct feed, grinding dwell and rapid return—started by one pushbutton. Feed movements are controlled in 0.0001-inch on the wheel feed dial.

Individual motor drives are used for the bowgage wheelhead unit, table trav-

erse, work spindle and coolant pump. Each motor is conveniently located, and belt adjustments are readily made. Electric circuits of the grinder are centrally located in a cabinet, and pushbutton controls for the individual motors are all located at the operator's finger tips. Base of the machine is of box construction with heavy walls and cross ribs.

Bench Milling Machine

Benchmaster Tool Co., 2952 West Pico, Los Angeles, announces an improved vertical bench milling machine with a quick-change attachment for horizontal milling. The 2½-inch diameter arm supporting the spindle head is clamped rigidly to the column and can be readily adjusted to rotate the spindle 60 degrees either side of center. The entire head

can be removed easily and replaced with an enclosed horizontal milling attachment. Thus, a variety of jobs such as precision die making, die sinking, profiling, jig boring, key slotting, etc., can be handled on this machine.

Compactly designed, this two-way ma-

ONE

MULTIPLE-OPERATOR SET

DOES THE WORK OF

20 TO 30

SINGLE-OPERATOR SETS

For continuous-duty, mass production welding where a large number of operators can work in a small area, specify Westinghouse Constant-Potential Multiple-Operator Sets. Welding control panels can be assembled in banks or used singly. Operating power factor, where synchronous motor drives are used, will average 80% leading. Over-all efficiency is 45%.

Operator control panels are available in single and two-operator types. Current range is 150, 200, 250 and 300 amperes. Same range for each operator on two-operator types. Dripproof enclosures. For latest literature, write to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N. J-90477

Westinghouse

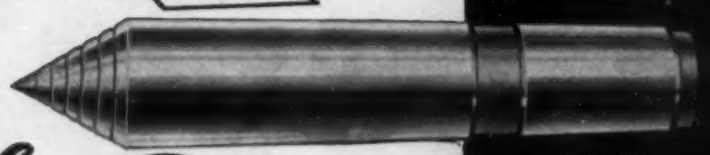
WELDERS

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

for CLOSE TOLERANCES

RIGID SUPPORT
No balls, rollers, or races to wear out and cause uneven tooling.

BETTER LUBRICATION due to exclusive helical groove*



Use CMD Helical Groove CENTERS AND CMD CENTER POINT OIL

★ The exclusive left hand helical groove in CMD Centers holds a reserve supply of lubricant and conveys it constantly to the extreme point of center. No burned out centers! No stopping machine to relubricate centers!

When CMD Helical Groove Centers are used with CMD Center Point Oil, they can be drawn up tight against the work, permitting closer tolerances and finer precision results.

On tough alloy steels, this combination of CMD Centers and CMD Oil is especially advantageous. A prominent Ordnance Plant user says, "We have found CMD Helical Groove Centers and CMD Center Point Lubricants **the only solution to our problem of tooling stainless steels** and chrome alloy steels. These hard metals expand so fast and the heat is so intense that we were always breaking centers or fusing them into the work. With **CMD Helical Groove Centers** and **Lubricants,** we have completely eliminated this difficulty."

Send coupon now for details on CMD Helical Groove Centers and a free sample kit of oil.

Write for FREE Sample Kit

CHICAGO MANUFACTURING & DISTRIBUTING CO.
Dept. 9ST, 1928 West 46th St., Chicago, Ill.
Send circular on CMD Helical Groove Centers
Without obligation to us, send FREE sample kit containing a tube of CMD CENTER POINT OIL and a tube of CMD CENTER POINT LUBE (grease) with directions for making an amazing, simple test.

NAME.....

FIRM NAME.....

ADDRESS.....

chine stands 30 inches high, has a precision ground table 6 x 14 inches, with three ⅝-inch T-slots on 2-inch centers. Micrometer adjustments for the table movements are operated by convenient splined disengageable hand cranks. Graduated dials reading in thousandths of an inch make resetting simple. Proper tension on the V-belt at all times is assured by a floating motor mount. Rapid changes of the four spindle speeds (450, 850, 1400 and 2100 revolutions per minute) are possible without the use of tools. The spindle has a No. 2 Morse taper. The milling machine is powered with a 1/3-horsepower motor.

Pressure Switch

Barber-Colman Co., Rockford, Ill., is offering a new micro pressure switch for proportioning control of motor-operated valves, power units, program switches, etc., for the regulation of steam, air and

gas pressures. It is a single-pole double-throw 3-wire instrument with positioning solenoid.

The unit features a pressure sensitive bellows mechanism, mounted on a bakelite sub-base and enclosed in a metal case for surface mounting. To protect contacts, it is provided with a built-in condenser. The switch is adjusted externally but the setting may be locked in place by means of internal locking screws.

Crane Control

Cutler-Hammer Inc., Milwaukee, announces a perfected alternating-current crane control which eliminates installa-

"They're a Sweet Pair for All-Around A. C. Work"

"With these two rods I can handle 'most any kind of mild steel welding when I want to use A.C.

"I use Alternex mainly with low open circuit, transformer type welders, and for light gauge work. It's colder than a Type A rod, so it's especially good where fit-up is poor.

"For heavy work with A.C., where you need deep penetration, good fusion and X-Ray perfect welds, I use the new Type A electrode. It's a honey for all-position welding, and especially in the overhead and vertical positions."

Send for the new Murex wall chart. It gives specifications on all Murex Electrodes, describes their applications and illustrates six ways of improving welding practice.

MUREX ELECTRODE	AWS-ASTM Class	IDENTIFICATION		Current	POLARITY		TENSILE STRENGTH OF DEPOSIT		ELONGATION OF DEPOSIT IN 2"	
		Color Of Coating	Color-Marking		Groove Welds	Fillet Welds	As Welded (p.s.i.)	Stress Relieved (p.s.i.)	As Welded %	Stress Relieved %
TYPE A	E-6011	Tan	End: None Secondary: Blue	A. C. or D. C.	Straight or Reverse	Straight or Reverse	62,000 to 71,000	60,000 to 68,000	22 to 26	27 to 32
ALTERNEX	E-6013	Pink	End: None Secondary: Brown	A. C. or D. C.	Straight	Straight	62,000 to 75,000	60,000 to 72,000	17 to 25	22 to 29

METAL & THERMIT CORPORATION

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

MUREX ELECTRODES

120 BROADWAY, NEW YORK

ALBANY • CHICAGO • PITTSBURGH
SO. SAN FRANCISCO • TORONTO

STANDARD

makes forgings

for Liberty Ships and Engines

ARMY E NAVY

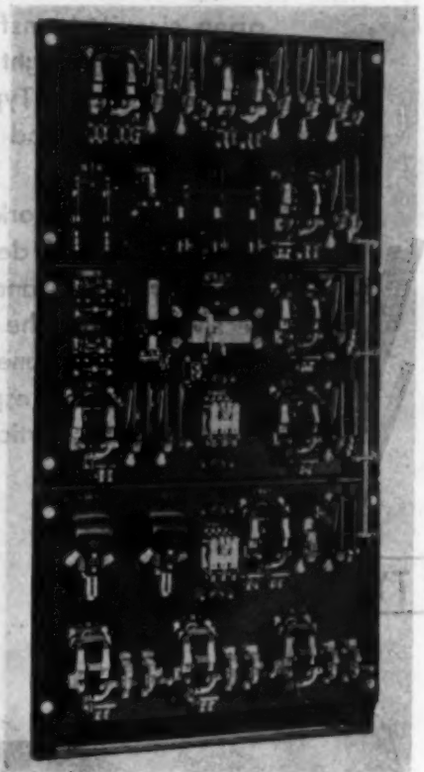
Steel forgings by Standard are working for America in the wartime cargo vessels of today, and will continue to serve in maritime tasks of tomorrow. For it is the acid open hearth steel that Standard makes . . . the rigid, scientific control of each manufacturing process . . . the skill of experienced personnel . . . that produces the high quality of steel forging that will render satisfactory future service after having "delivered the goods" today.

STANDARD STEEL WORKS

DIVISION OF
THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

tion of direct-current generating equipment or rectifiers. It provides dynamic lowering over five stable speed points, accurate inching for spotting loads and timed acceleration in both directions from a standard 5-speed master. In lowering, the retarding torque increases as the master switch is notched back until, in the "off" position, maximum dynamic braking is combined with an auxiliary electrically operated brake for a quick, complete stop. Mechanical load brakes are



entirely eliminated with this new control. Operation of the 5-speed master switch duplicates conventional direct-current crane operation. Moving the master switch to the first point lowering or hoisting provides a slow speed which is increased as the master switch is moved to successive notches. If the master is moved directly to the last position, acceleration is automatic under control of time limit relays.

Chip Breaker Grinder

Carboloy Co. Inc., Detroit 32, announces a new grinder designed for grinding chip breakers in carbide tools of both single point and roller turner types. It also can be adapted to use for grinding flat form tools and round or square boring bits. When grinding the top of small bits the traverse mechanism can be changed from direct drive to slow speed through a 5:1 reduction ratio. This gives a short stroke at slow speed.

The grinder can handle tools up to 2 inches wide. Table length of the grinder, which has 10¾ inches of travel, makes

DIESEL CRANKSHAFTS

Here you see the big new powerful Wickes Model UH-60 Universal Crankshaft Lathe which machines Diesel crankshafts having main line bearings and crankpins up to 10" in diameter and strokes up to 14". This lathe is built in both single and drive for turning all main line bearings and double end drive for turning crankpins. • Equipped with independent hydraulic feeds and rapid traverse to both carriage and cross slide. • If you are interested in a lathe built expressly for stepping up the machining operation on big Diesel cranks, write for details about the Wickes Universal Crankshaft Lathe UH-60. • Other Wickes Lathes from 36" to 72" are available for machining gas engine, truck, tractor and airplane crankshafts.

WICKES LATHES

CUT COSTS • SPEED PRODUCTION

WICKES BROTHERS • SAGINAW, MICHIGAN • EST. 1854

Crankshaft Turning Equipment • Double-End Boring Lathes • Heavy Duty Engine Lathes • Special Production Lathes • Simplex Blue Printing Machines

Manufacture YOUR OWN CUTTING TOOLS by the

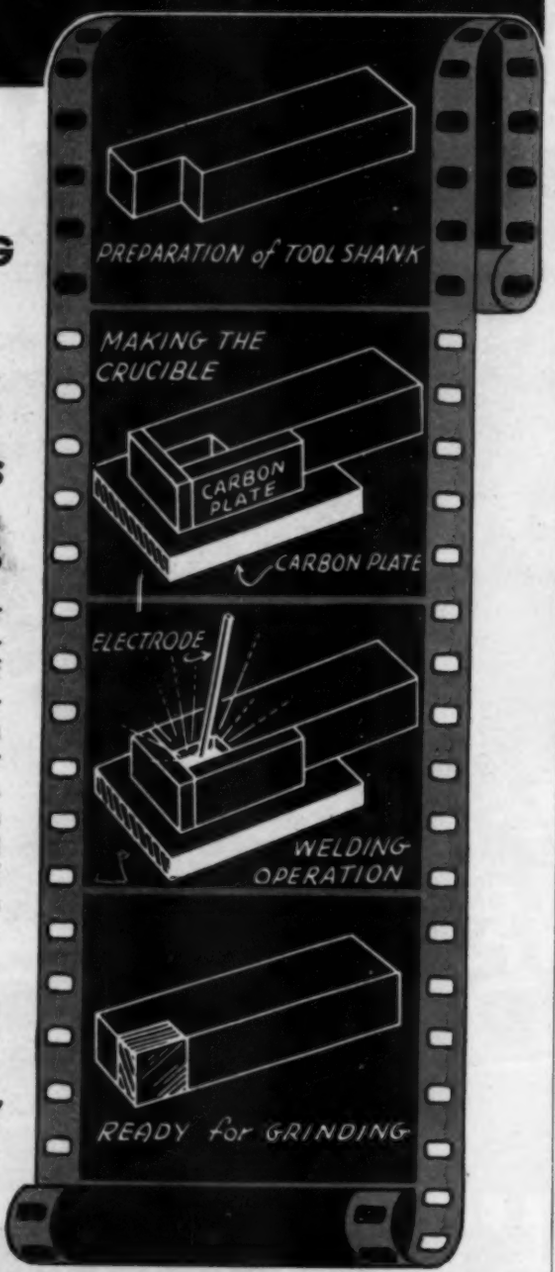
AGILE CRUCIBLE ARC-WELDING METHOD

•

AGILE SILVER SERIES WELDING ELECTRODES

are specially designed for the building-up of high-grade cutting edges of all kinds. The illustrations at right show, in sequence, the proper method of forming a cutting tool edge. This Crucible-Arc method gives a weld deposit of *dense* hard metal that is easy to make and absolutely free of porosity.

We have just compiled a data sheet (11" x 25") suitable for catalog enclosure or wall chart, giving complete Silver Series information. It's yours for the asking!



AGILE ACTARC

AMERICAN AGILE Corporation

5800 HOUGH AVE · · CLEVELAND, O.

possible the grinding of breakers in both right and lefthand tools without moving the universal fixture on the table. Designed to use 6-inch wheels, the head is vertically adjustable from either side of the machine. To facilitate the grinding of chip breakers in roller turner tools, the universal fixture is designed to tip 90 degrees either side of horizontal and the center of the fixture can be cross-fed 1

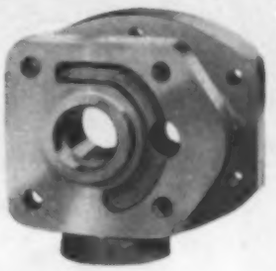
inch past the center of the wheel. Rugged knee construction is beneficial where accuracy is required in grinding flat form tools.

A base, 29 inches high with large storage space, is available with the machine. The universal fixture and vise for holding tools up to 1¼ inches wide is provided with the grinder; also as standard equipment are a wheel guard and wheel lubricant tank, necessary wrenches, and flexible light bracket and reflector. Standard motor is single-phase 110-volt 60-cycle ¼-horsepower at 3450 revolutions per minute. Shipping weight of grinder without pedestal is 290 pounds; with pedestal approximately 390 pounds.

Heating Device

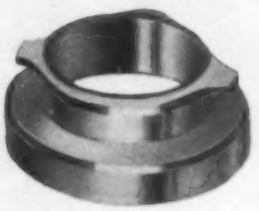
An automatically-controlled development for adding heat to industrial liquids in heat exchangers in order to maintain constant temperatures is announced by Niagara Blower Co., 6 East Forty-fifth street, New York. It can be used to

TO MASS PRODUCE PARTS LIKE THESE...



Turn to Turchan

THE ALL-HYDRAULIC DUPLICATOR



THE *forte* of Turchan Followers is high speed production of parts like those pictured here. Any part of irregular or eccentric shape or contour — any part that normally requires time-killing and painstaking hours on a machine tool *can be produced with a Turchan-equipped machine tool from three to twenty times faster.*

Turchan-equipped machine tools do not require highly skilled operators — no matter how intricate the machining job on hand may be. Any fair machine hand can handle one efficiently.

Turchan Followers attach easily to any standard lathe, shaper, grinder, planer or mill. Furthermore, they can be quickly disengaged whenever direct machining is desired. That's why many production men are *Turning to Turchan,* for faster, more efficient output. *Send for our new, free booklet on Turchan Followers today.*

TURN TO Turchan

FOLLOWER MACHINE CO.

Originators of Hydraulic Duplicating Attachments

8255 Livernois Avenue — Detroit 4, Michigan

Mr. Subcontractor:
YOU'LL BE NEEDING EXTRA AMPERES FAST
TO MEET INCREASED PRODUCTION DEMANDS!
Here is a chromic acid anodizing arrangement. Rectoplaters can be combined to meet any plating, cleaning or anodizing requirement.

When you are asked to double your output over night. When the walls of your present quarters already bulge from crowding and expansion is impossible. When you can't possibly squeeze in *more* bulky machinery—and you need those extra amperes *fast*. THAT'S A JOB FOR UDYLITE-MALLORY RECTOPLATERS.

Rectoplaters are small, compact units, standardized in design and production, tested by years of actual service in plants all over the country. Each unit delivers 1440 amps at 6 volts or 720 amps at 12 volts. They are easily moved wherever needed, require little floor space and no special installation.

Rectoplaters may be used individually or in series when greater amperage is required. They require no conversion for peacetime use.

(RECTOPLATERS ARE IN STOCK FOR IMMEDIATE DELIVERY)

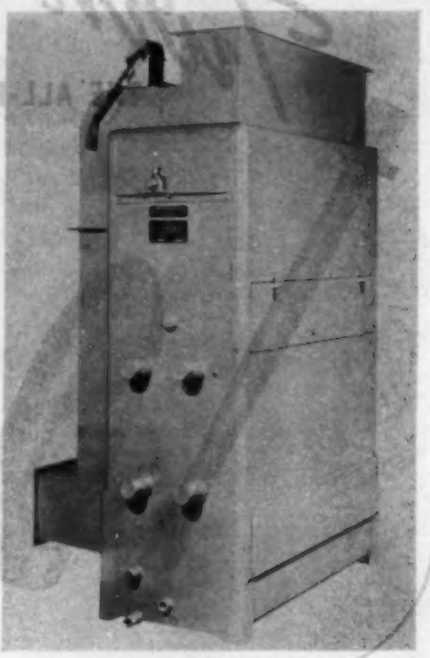
THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit 11, Mich.

Chicago 12, 1940 Walnut Street · Long Island City 1, N. Y., 11-16 44th Drive · Cleveland 3, 4408 Carnegie Ave.

control temperatures in industrial, chemical processes and electrical equipment by controlling jacket-water temperatures, also quenching baths in the heat treating of metals, cutting oils and lubricants in metalworking, machining and wire drawing.

Temperatures are controlled by using either a steam coil or injector or an electric heating unit to heat the spray water. The heating device is put into operation by thermostatic control at the desired point, preventing the liquid from becoming too cold for the process in which it is used, or from becoming viscous with



retarded flow and loss of capacity, or from congealing or freezing. This also makes it possible to install the heat exchanger successfully out of doors, or to use fresh, out-of-door air to increase its evaporative cooling capacity.

Milling Cutter

Super Tool Co., 21650 Hoover road, Detroit, announces a new carbide-tipped milling cutter with cast alloy body said to be instrumental for production increases of as much as 300 per cent in milling aircraft landing gear parts.

Made with a minimum number of flutes necessary for various classes of work, the cutter is designed so simple that its price is reduced to a point where it can be used generally on short runs and for general shop tooling.

A feature of the development is it can be operated at greater speeds—providing finishes comparable to ground surfaces. Greater accuracy also is claimed at these higher operating speeds. The feed per tooth being lower, the cutting pressure is lessened and there is con-

You bet they're Tough

...making 'em tough is our business

"This award symbolizes your country's appreciation of the achievement of every man and woman in the United States Spring and Bumper Company"

ROBERT P. PATTERSON
Under Secretary of War, July 24, 1943

Your sons (and ours) are fighting this war with the most modern, highly developed weapons, many of which are equipped with unbelievably tough armor plate. The ability of this armor to stop or deflect enemy fire means life itself to our fighting men.

We believe you are interested in the award of an Army-Navy "E" to the men and women of the United States Spring & Bumper Co., because much of the war equipment they have been making is armor plate for aircraft, tanks, tank retrievers and gun mounts.

United States Spring & Bumper Co. is the first armor plate manufacturer on the Pacific Coast. An important and difficult task was assigned those who labor at heat-treating furnaces — great straightening presses — the scores of arduous tasks necessary to the production of armor plate. They did their work so well that now all the workers at United States Spring & Bumper Co. proudly wear the Army-Navy "E" pins awarded to them by their country for their achievement.

And above our plant now flies the Army-Navy "E" flag — a constant reminder to all of us of our great obligation to the many who place such faith and confidence in our work.

WARTIME PRODUCTS	PEACETIME PRODUCTS
ARMOR PLATE FOR AIRCRAFT, TANKS, AND TANK RETRIEVERS	SPRINGS AND BUMPERS FOR PASSENGER CARS, TRUCKS, AND TRAILERS, ASSEMBLED ON THE PACIFIC COAST
ARMOR SHIELDS FOR GUN MOUNTS	HIGHWAY GUARD RAILS AND ROAD-CENTER DIVIDERS
SPRINGS FOR JEEPS, HALF-TRACKS, AND TANK RETRIEVERS	AGRICULTURAL CULTIVATOR STEELS
FORGINGS FOR AIRCRAFT	OTHER PRODUCTS USING HEAT-TREATED, SPRING-STEEL
BOLO KNIVES FOR FILIPINO REGIMENTS	

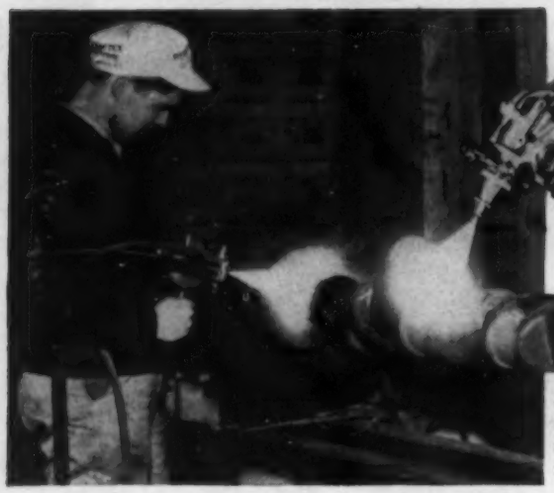
★ *YES, it is YOUR WAR BONDS, and OURS, which will assure more...and still better...airplanes, tanks, guns, and other vital weapons for our fighting men whose need is so great.*

UNITED STATES SPRING AND BUMPER CO.

JOHN B. RAUEN, *President*

4951 ALCOA AVENUE • LOS ANGELES 11, CALIFORNIA

Critically Needed Machinery SALVAGED



Courtesy Metallizing Company of America

. . . with the help of KEYSTONE Wire

Under the pressure of rapid fire, three-shift production, machinery is wearing away many times faster than normal. Thousands of essential moving parts go out of service daily.

Metallizing, however, has become the magic word for revitalizing "laid up" machinery, restoring service quickly, saving countless tons of metal, hours of machining and assembly — and avoiding overburdened replacement costs as well.

In this service of salvage, Keystone wire is performing a basic wartime function — another important reason why Keystone production for civilian uses must be restricted until Victory is assured.

Above—Here a badly worn crankshaft is built up with the metallizing gun for machining back to original dimensions. Wire enters the back of the gun and is sprayed through the nozzle in molten form onto the worn surfaces. One of thousands of wartime uses for wire mill production.

The most critical raw material is still SCRAP. Get every pound to the steel mills.

KEYSTONE STEEL & WIRE CO.

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

PEORIA ILLINOIS

sequently less distortion of the work. Another advantage is the throwing off of the major portion of the heat in the chip, leaving less to be absorbed by the work and the cutter.

On actual production jobs, the cutter is being used successfully in steel at surface speeds of 400 to 600 feet per minute with tooth load varying with the hardness of the steel from 0.0005 to 0.0025-inch, it is said. Standard cutters for cutting cast iron, brass, bronze, copper, aluminum and magnesium are supplied in diameters from 3 to8 inches in a variety of widths. These tools are 4 or 6 flutes. For cutting steel, sizes are offered with 6 to 16 flutes, according to the diameter.

Electrically-Heated Airbrush

Better insulation for trigger and handle—better balance for easy operation and precise control of round and fan spray by calibrated dial are features of the new type F-974 electrically heated airbrush introduced by Paasche Airbrush Co., 1909 Diversey Parkway, Chicago.

The unit heats both the air and ma-

terial. Heat is thermostatically controlled from a low of 180 degrees Fahr. to a medium of 260 degrees and a high of 320 degrees Fahr.

A new type cup with large 3⅝-inch opening and removable snap-on cover simplifies cleaning and filling of the unit.

About 10 to 30 pounds of air pressure are required to operate the airbrush.

Welder

Glenn-Roberts Co., 1009 Fruitvale avenue, Oakland, Calif., reports a new model, G-3 49, heavy-duty manually-operated transformer-type alternating-current welder. An oversize core, working at low flux densities, insures an extra margin of safety in handling continuous welding loads. Two open-circuit voltages give a wide variety of applications, par-

ARMOR-VIT ... now on army field ranges

ORIGINALLY, Army field ranges were made of stainless steel. Due to the need for conversion to less critical materials, this specification was changed to galvanized sides and back, porcelain enameled interior, zinc plated castings, and all other parts finished in oil or wax.

But Army field ranges have to "take it" whether in the Aleutians or the Solomons. The transportation hazards and abuse to which they are subjected are almost unbelievable. 800° F. in the interior, with salt air or salt-water on the exterior. ... Well, the ordinary finishes just wouldn't stand up—and the army said "No" to any bright metals in the field.

The problem was to get a finish that had both endurance and low reflectance. The answer was: **ARMOR-VIT.** Here was a finish, available in olive-drab, gray or black, which was highly resistant to corrosion, rust, impact, scratching, abrasion, heat, thermal shock, alkalis, or acids. Its lusterless, matte finish provided the necessary camouflage.

Being a priority-free finish, **ARMOR-VIT** is making it possible for some manufacturers to substitute iron or steel for the more critical metals, such as chromium, zinc, nickel, cadmium, bronze, brass, tin, etc. Investigate **ARMOR-VIT** today. It has remarkable properties.

Although ceramic in nature, there is no comparison between **ARMOR-VIT** *and porcelain enamel, paint, lacquer or synthetic finishes. It is non-volatile, non-explosive. It withstands heat of over 1000° F., and is unaffected by the standard 200-hour salt spray tests, or weatherometer tests equal to 5 years normal weather.*

ARMOR-VIT DIVISION

CHICAGO VITREOUS ENAMEL PRODUCT CO.

Cicero, Illinois

PARTS INVENTORY SLASHED 91%

with Increased Output!

With

LAMSON CONVEYORS

In a humming aircraft engine plant, a Lamson engineer set out with company officials to speed production. Lamson Conveyors in the crank case department reduced the distance parts travel from over a mile to 1600 feet. With the efficiency achieved by expert coordination, the parts inventory was cut to 1/12 its former size. The savings on interest alone paid for the entire installation in ONE WEEK!

Incredible? Yes—almost. Yet this is but one of the many such reports of amazing economies in time and money and corresponding increases in production achieved by Lamson . . Lamson Conveyors eliminate the confusion and waste of outmoded materials moving methods and multiply the output of available manpower.

No matter what you make now—or expect to make after the war—it will pay you to have a Lamson materials-handling engineer make a survey of your plant and suggest ways to modernize and streamline production.

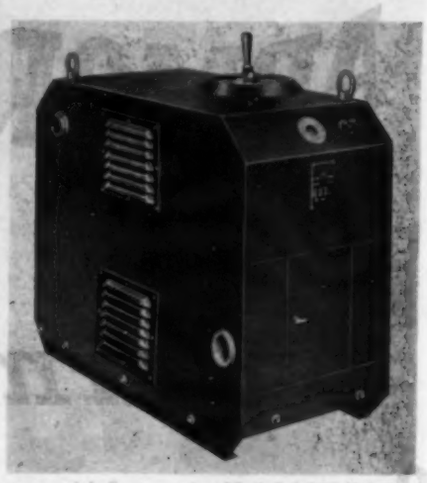
Smashing bottle-necks is an old story to Lamson engineers

LAMSON Corporation

Dept. ST SYRACUSE, N. Y.

Makers of CONVEYORS and PNEUMATIC DISPATCH TUBES

ticularly for heavy plate, within the machine's output range of 100-675 amperes. Because the welder remains extremely cool at work (meeting the temperature rise



specifications of NEMA) without having its forced ventilation system in operation, no damage to the machine will result if the standard forced ventilation system should at any time become inoperative. A contactor with push button control is provided, and the machine can be changed from hand to automatic operation when desired. Rods from ⅛ to ⅜-inch diameter can be handled—the only required adjustment is a twist of the hand wheel.

Soldering Transformer

American Car & Foundry Co., 30 Church street, New York, is offering a new electric soldering transformer, type

T-37, for crimping two brass cups with a ring of soft solder between the cup and the brass disk, shown in the illustration. The disk here is of brass, about ⅛-inch thick, between 2½ and 3 inches in diameter. By pressing down on the transite board of the unit, the front edges of the copper pressure shoes spring up

Wheels for *any* CENTERLESS Grinding Job!

There are reasons for BAY STATE Superiority through Scientific Manufacturing Control.

1. FRACTIONAL GRADES — permit a wider range for a more accurate wheel selection.
2. CONTROLLED POROSITY — assures duplication.
3. H9 BOND — offers cooler cutting, greater wheel life, better production.
4. PATENTED INSTRUMENTS — for checking the hardness of grades. *Send for Bulletin.*

BAY STATE

ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

At airplane plants, thousands of parts for huge bombers are checked in daily at receiving docks, or issued from stock, with Toledo Counting Scales!

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so the operator can slip in the disk. When the operator removes his hand from the lever the disk is firmly pressed to the electrodes by these pressures.

With a load of 9½ amperes on 220 volts, the transformer runs the soft solder in 11 seconds. A—on the dials in the front—is high, and B is low. The unit features five heat speeds, providing ten heat ranges for the various grades of work. The transformer is composed of four legs of silicon steel; the primary capacity is 4-kilovolt-amperes; the secondary capacity runs from 2 to 0.7-kilovolt-ampere. The 1-turn secondary features a 9-voltage range from 0.3 to 0.9 volts.

Improved Countersink

A split keeper which is used to give positive set to the retainer collar on bearings is now incorporated in all micrometer stop countersinks manufactured by Aero Tool Co., Burbank, Calif. With this feature, no amount of vibration will

loosen the bearing retainer and cause damage to the tool or material on which it is used.

Keeper inserts work on the slotted, taper shaft principle. Force is directed toward the shaft center under constant, even pressure. The unit may be immediately disassembled by hand as no tools are required. On-the-job oiling and other required servicing becomes a matter of moments.

Larger Electrodes

(*Continued from Page* 105)

tionately lower rate of weld deposition. The threaded shaft of the positioner permits the box to be easily rotated for welding a continuous bead along each successive corner joint.

In welding the eight U-shaped bolt brackets to the sides of the box, a different fixture is required for the positioner. This fixture, Fig. 5, has a post mounted on each corner of a flat plate. Two of the posts have a pin extending from the top over which the box is mounted by passing the pins through the holes in one of the mounting straps. The box rests on the top of the other two posts of the fixture. A union is welded to the bottom center of this fixture and screws on the shaft of the positioner.

Fig. 5 shows the welding operator finish-welding the bolt brackets which have a thickness of ⅛-inch. A bead is placed along the top and sides of the bracket at the points where it contacts the side of the box.

Electrode Change Speeds Work

The work is tilted at about a 30-degree angle. Increased speed and efficiency were obtained here by changing from ⅛-inch electrodes to the present 3/16-inch size, using a current setting of about 270 amperes.

After the lugs have been tack welded to the cover, the finish welding is done on the same fixture employed in welding the mounting straps, Fig. 3. In this instance, the fixture plate fits inside the cover as indicated in Fig. 8. A bead of weld metal is placed along the back edge of the ⅛-inch thick cover lugs, fusing them directly to the cover. Here the same current setting and electrode size used for welding the side bolt brackets is employed—3/16-inch rod at 270 amperes.

The work is tilted at about 30 degrees and the cover is revolved on the positioner shaft so the downhand position can be used for welding each pair of lugs on successive sides of the cover.

The L-shaped brackets of ⅛-inch mild steel which are located on the inside of the box near the bottom, see Fig. 6, are used as supports for two fuse blocks which are later installed in the completed unit. These inside brackets, also positioned by means of special clamping fixtures, are spot welded only and do not require arc welding. Three of these brackets are visible inside the open box at the left in Fig. 6.

After all welding operations have been completed, the entire box and cover are spray painted, then a one-piece molded rubber gasket is hand-pressed into the channel formed between the Z-angle and the top sides of the box. The gas-

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ket is shown in place in the box at the left, Fig. 6. A rubber mastic material is first applied in the channel to seal in the gasket and produce a tight, waterproof fitting. The gasket is of such thickness that the top edge of the rubber extends slightly above the top edges of the box.

Hinged thumb screws are then fitted into the side brackets of the box. These fittings are chromium plated and consist of a pin with a threaded hole in the center, into which a threaded bolt is screwed. A spacer, placed over each threaded bolt between the pin and the cover lug, Fig. 7, acts as a pressure equalizer when tightening down the cover.

In other words, the thumb screws can be tightened down only to the point permitted by the spacer, assuring equal pressure on all eight clamping points. The cross-section view, Fig. 7, illustrates how the pressure exerted by the cover against the rubber gasket spreads the top edge of the gasket against the underside of the cover, assuring a tight seal.

The completed box, with the cover fully clamped into place, is shown at the right in Fig. 6. Completed boxes are tested for water-tight construction by placing them under water and injecting air into the box through the drain outlet fitting welded in the side near the bottom of the box. The fitting is threaded so the air line can be attached to it securely. The boxes must show no leak when an air pressure of 5 pounds per square inch is applied.

The manufacturer reports rejects have been practically eliminated because of carefully welding the joints and the effective method of sealing the cover. Results of these fabricating operations have generally proved satisfactory. The greater welding efficiency and speed obtained by increasing electrode sizes also has proved satisfactory. The benefits are due to a higher rate of weld deposit and a marked reduction in number of electrode changes necessary.

Booklet Discusses Sands Used in Various Foundries

Advantages of synthetic sands over natural molding sands, steel sand formulas, proper mixing of Bentonite and sand in the foundry, and the use of Volclay Bentonite in the gray iron foundry are among subjects discussed in a new 48-page booklet recently issued by American Colloid Co., Chicago.

Entitled *Foundry Sand Practice*, the publication is written by Clyde A. Sanders, company engineer. Besides discussing sands used in malleable, steel and gray iron foundries, it provides a number of tables useful to foundrymen.

Advertisement SEPTEMBER, 1943

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*

New Possibilities in Phosphor Bronze For Post-War Products

Strength, Resilience and Fatigue Resistance Ideal for Spring Metal and Other Machine Parts

One of the most important alloys in this mechanical age is Phosphor Bronze—copper alloys ranging from 3 to 10% tin and a small amount of phosphorus. It possesses an unusual combination of exceptionally fine properties—great strength and toughness, remarkable resilience, excellent corrosion and fatigue resistance, and the general all around workability characteristic of wrought copper alloys.

Because of its dependable spring properties—excellent resilience within its endurance limits—and resistance to the effects of arcing, it is ideal for the vital functional parts of the countless mechanical devices of this civilization. Foremost are those items of an electrical nature associated with the manufacture, transmission and utilization of electricity—switches, controls, circuit breakers, signalling devices, etc.

It is therefore found in practically all electrical machinery from powerful locomotives to toy trains; electric appliances of all kinds, such as radios, refrigerators, washing machines, stoves, irons, toasters, precision instruments, pressure and temperature controls and many others used in peace and war. The spring properties of Phosphor Bronze are also desirable for many mechanical devices such as lock washers and spring fasteners to prevent nuts and bolts loosening from vibration.

Other Properties of Phosphor Bronze

The versatility of Phosphor Bronze is not confined to springs alone. Because of its low coefficient of friction and resistance to wear when in contact with moving parts made from steel, it is used as a bearing material for bushings and shafts for electric motors, valve parts, etc. Another important application is for clutch plates where discs of bronze come in contact with steel. Since it is superior to most alloys in its resistance to corrosive liquors, it is preferred for paper mill equipment handling pulp products. Mechanically it is strong yet ductile; consequently it can be stamped and drawn and lends itself to the manufacture of diaphragms, metal bellows, etc., found in temperature and pressure control devices and instruments.

Importance of Quality

There are many other factors besides composition and temper which determine whether Phosphor Bronze spring metal is satisfactory in quality, such as its ability to stand up after many thousands of flexes without breaking. As a matter of fact, ordinary laboratory tests, such as those for tensile strength, per cent elongation, hardness values and chemical composition, do not tell the whole story or reveal whether Phosphor Bronze is suitable for a given application. The best procedure is a service test where the Phosphor Bronze part is put through its required flexing a sufficient number of times.

Phosphor Bronze is considered a difficult alloy to manufacture because it is sensitive to impurities such as gas, oxides, etc. Furthermore, in the early stages of its manufacture it is a comparatively weak alloy which becomes strong after it passes the critical stage. Bridgeport's modern Rolling Mill is ideally suited for the manufacture of Phosphor Bronze. Here large cakes are rolled as compared to small bars, which is the practice in old-fashioned mills. Strict control over the ingredients which must be of the utmost purity, careful laboratory supervision over annealing and rolling schedules, and powerful four-high Rolling Mills to process the cakes into sheet metal, in addition to careful inspection are responsible for retaining the inherent qualities characteristic of Phosphor Bronze. Actual tests to destruction have shown the superiority of Bridgeport Phosphor Bronze over other bronzes.

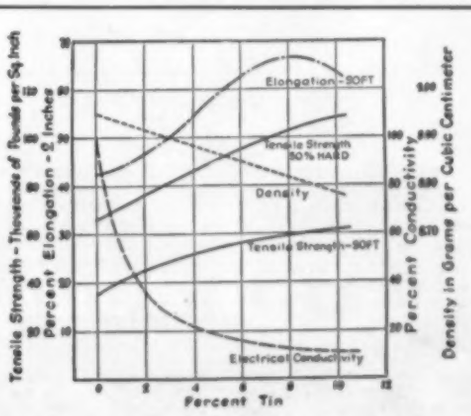
Phosphor Bronze is doing a remarkable job in the manufacture of the many instruments and products essential for the war effort. Planners of the post-war would do well to suggest how this dependable alloy of many talents can fit into the products which are in the offing.

Memos on Brass—No. 41

Brass of the correct alloy and temper is admirably adapted to the production of shapes by the cupping and deep drawing processes. Because of its greater ductility and lower tensile strength as compared to steel, however, a certain amount of additional care is necessary, particularly in the design and maintenance of tools and in the selection of drawing lubricants.

At Bridgeport, modern equipment, skilled manpower and precision control are geared to achieve maximum production of quality brass mill products. Shown here are part of the modern drawing facilities that are turning out quality rod for wartime needs.

Shown in the curve at the right are the effects of tin content on the elongation, tensile strength, density, and electrical conductivity properties of bronze (copper-tin alloys).



CAUSES OF CORROSION

INFLUENCE OF pH ON CORROSION RATE

It has been shown (see November, 1942, issue) that the displacement reaction

$$M + H^+ \rightarrow M^+ + H$$

is of primary importance in the corrosion of metals. This reaction indicates that a metal may be expected to corrode more rapidly when the concentration or number of hydrogen ions is high (low pH value); and if there are only a few hydrogen ions available (high pH value) the reaction should proceed only slowly towards the right. The curve below, in its general shape, is a typical corrosion rate vs. pH curve for such materials as copper, brass, bronze and other metals and alloys, in aerated 3% sodium chloride solutions where the pH has been varied by additions of either sodium hydroxide or hydrochloric acid.

The individual corrosion characteristics of any metal or alloy would act to modify the shape of the curve in one or more ways. The minimum may be broad or short, the slopes slight or steep, and the whole curve displaced in any direction depending upon the metal or alloy. Changes in composition and temperature of the corroding solution will also introduce still further modifications in the shape of the curve.

Corrosion Occurring at High pH Values

It will be noted from the curve that corrosion takes place at all pH values. This means that even though the hydrogen ion concentration is extremely low at some pH values, there are nevertheless enough hydrogen ions available for the reaction to proceed. As the hydrogen ions are being removed by the corrosive reaction, more hydrogen ions are being continually formed by the dissociation of water:

$$H\,O\,H \rightleftharpoons H^+ + OH^-$$

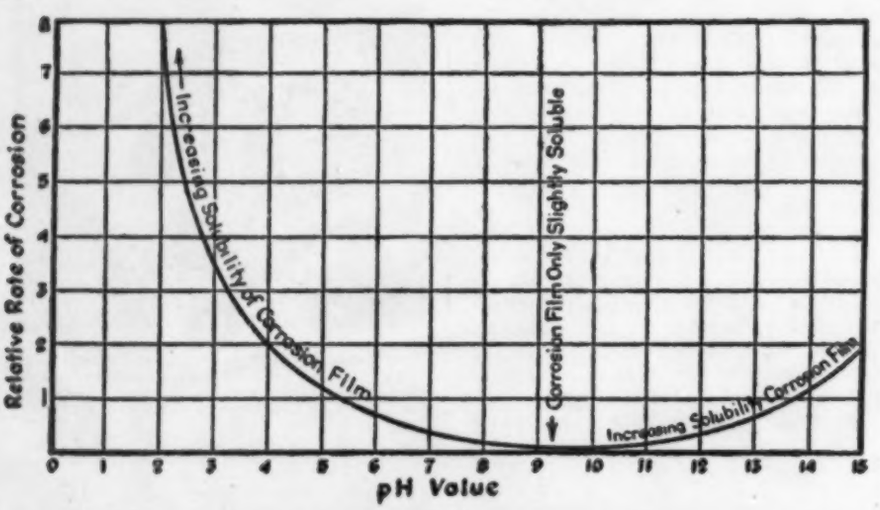
partly replacing those removed.

Corrosion Occurring in Closed Systems

When corrosion occurs in a closed system the pH may gradually rise due to the accumulation of corrosion products (of a basic nature) and the consumption of hydrogen ions. This rise in pH will tend to stifle the reaction because the corrosion film may be less soluble at the higher pH value and less hydrogen ions are available to drive the reaction forward. While the overall corrosion rate of copper base alloys is substantially lower at the higher pH values than at the lower pH values, the nature and distribution of the corrosion products sometimes lead to localized corrosion (deep pits), as discussed previously.

At still higher pH values (low hydrogen ion concentration, high hydroxide concentration) the solubility of the corrosion film increases markedly with decreasing hydrogen ion concentration. In the basic range the metals corrode with the formation of soluble alkali salts such as the aluminates, zincates and other complex anions.

(This discussion of the influence of pH on rate of corrosion will be continued in the next issue of the Bridgeport Copper Alloy Bulletin).


Relative Rate of Corrosion
pH Value
Increasing Solubility of Corrosion Film
Corrosion Film Only Slightly Soluble
Increasing Solubility Corrosion Film
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
1 2 3 4 5 6 7 8

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

A Heavy Duty Bender-Cutter which may be used for bending intricate shapes out of flat or round spring or cold rolled steel, copper or brass has been placed on the market. This machine, which is useful for bending samples and short runs of 100 or 200 pieces, is furnished with a complete set of dies and mandrels. **(No. 480)**

Toggle Pliers designed for holding pipes, tubes, rods and other cylindrical items during manufacturing operations are offered. These pliers lock into position and hold securely at any point within their gripping range. The standard model will hold any cylindrical object from ⅛ to 1¼ inches. Other sizes will be bored and slotted to fit the user's requirements. **(No. 481)**

A Portable Cable Vise for simplifying the arduous job of splicing, clamping, or forming wire cable into eyes or around thimbles has been introduced. ⅜ to 1¼ inch cables are held securely by a pair of inbuilt vises which are provided with guards to protect against cable and thread friction. **(No. 482)**

A Tap Grinder Attachment has been developed which is said to be suitable for use on any type of flat table grinder, tool and cutter grinders, surface grinders, cylindrical grinders and even bench lathes. This device makes possible the precision resharpening of taps with the utmost simplicity of adjustment. A built-in chamfer protractor, a shifter for 2, 3, or 4 flutes, and a variable relief adjustment screw permit ready orientation of the work. **(No. 483)**

A New Precision Automatic is available which is said to facilitate the manufacture of small slender parts requiring precision limits and a fine finish. It has a 5/32-inch diameter bar capacity and a maximum turning length of 1 9/16 inches. Spindle speeds range from 1500 to 12,000 revolutions per minute and machine cycles vary from two seconds to five minutes. Limits of plus or minus 0.0002 inch on diameter and concentricity can be maintained. **(No. 484)**

A Solid Adjustable Die Head has been developed for use on automatic screw machines. These heads, available for Nos. 00, 0 and 2 machines, come complete with holders and an alignment feature that takes care of misalignment of turret and spindle. It is said that since these heads have no moving parts, there is almost nothing to get out of order. **(No. 485)**

A Reciprocating Sander for finishing jobs which are difficult to do by hand has been developed. This unit is said to eliminate the violent vibrations ordinarily expected from a speed of 3000 oscillations per minute. Equipped with hand grips, its balanced weight and smooth action permit even pressure on the work with only guidance necessary on the part of the worker. **(No. 486)**

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

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BRASS AND COPPER PIPE.

Note: Bridgeport products are supplied in accordance with existing priority regulations.

*Trade-name.

BRIDGEPORT BRASS

Chromium Plate

(*Continued from Page* 118)

may be plated directly to size with sufficient accuracy, and in some cases also in the greater thickness; but generally it is more practical and economical to get the accurate sizing required by grinding or lapping to size after plating.

On gages, a plate 0.002 to 0.004-inch oversize in diameter usually provides sufficient stock for grinding, allowing for eccentricity in successive grinding setups, but the amount actually required may be more or may be less depending on the size of the gage as well as other factors, such as grinding equipment and methods.

Heat Treatment Recommended

The finish on the gage should be smooth and lustrous. As a rule, the ground, lapped or honed finish is adequate, but a light buffing operation for the final finish may be desirable.

A stress-relief heat treatment after plating is advisable, especially for the gages with sharp corners and edges and gages having higher hardness values before plating. See recommended practice B 177 for recommendations as to the hardness of steel and stress-relief heat treatment after plating.

Tube-Drawing Dies and Plugs: As in the case of gages, many tube-drawing plugs and dies are ground undersize, plated oversize and ground to size for use.

Unlike gages, however, dies very often are used without grinding or finishing after plating, because the size tolerances are usually greater and the first few passes of the work over the die produces a satisfactory finish. Dies and plugs are given stress-relief heat-treatment after plating.

The best thickness of chromium for drawing plugs and dies depends on the material to be handled, the speed of drawing, and the reduction in each draw. A typical thickness of deposits is 0.003-inch. In some cases of large dies or large tolerances thicknesses as great as 0.008 to 0.010-inch are applied, and in others deposits as thin as 0.0005-inch are used. These lower thicknesses are applicable to some of the smaller plugs and dies, and have been used to avoid the extra grinding operations often necessary with the heavier deposits.

Forming and Stamping Dies: Like in tube drawing, the thickness of plate on forming dies depends largely on the material being worked, and the particular operation, but generally the plate thickness is less than that used for tube drawing.

With simple forming operations a thickness of 0.001 to 0.002-inch is gen-

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FOR GENERAL WIRE, eliminate "specials" from specifications if you have not already done so and, again, see that there is no waste.

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erally satisfactory. For deep drawing and working thin-wall sections, thinner deposits are often better, down to 0.0002 to 0.001-inch.

The same applies to stamping, shearing, and blanking operations; similarly, coining dies should have the thinner deposits, 0.0002 to 0.0005-inch. A generalization for these types of dies and tools is that for those operations involving sharp impact or cutting action, the thickness of deposit should be kept at a minimum consistent with getting economical and efficient performance from the plating operation.

Wherever there are sharp edges or wherever impact is involved, the heavier deposits show greater tendency to spalling or chipping.

Molding Dies: Except where highly abrasive materials are being molded, the plate thickness on molding dies need not be very great. For most plastics, thicknesses of 0.0002 to 0.0005-inch are generally satisfactory; for clays and similar materials, heavier deposits up to 0.002-inch thick are recommended; and on large work, still higher values can be utilized.

Thin Deposits for Cutting Surfaces

An important factor in good results from plated molds is the finish of the molding surface before and after plating. Except where dull or special finishes are required on the molded product, the mold should be finished to a high luster by lapping, polishing or buffing.

Cutting Tools: The thickness of deposit should be kept at a minimum consistent with getting most economical or efficient performance from the plating operation. Cutting surfaces in general should have relatively thin deposits to minimize tendency to spalling or chipping; usually not more than a few ten-thousandths inch thickness, and in many instances less than 0.0001-inch, as little as 0.00005-inch.

With cutting tools especially, the best thickness of plate depends not only on the operating conditions, such as speed and amount of cut, but also very largely on the material being cut. The best thickness for cutting steel might be quite different from the best thickness for cutting hard rubber or plastics or even metals like aluminum, zinc, brass, or copper.

A generalization here is that the harder the metal being cut, the thinner should be the chromium deposit. The thinner deposit sacrifices the longer wear a heavier plate might give, but in cutting on harder and tougher materials, the heavier deposits show greater tendency to fail by chipping or spalling.

A suggested range of plate thickness for cutting tools in general is 0.00005 to 0.0001-inch for hard steels, 0.0001 to 0.00025-inch for mild steels, cast iron

and nonferrous metals like aluminum, brass, bronze, copper, and zinc; and 0.00015 to 0.0005-inch for nonmetallics.

Inasmuch as most cutting tools have thin cross-sections and are made of high speed or high-carbon steels, heat treatment for stress relief after plating is especially recommended. Attention should be given also to the hardness of the tool before plating, to see that it is within recommended hardness limits (C62 to C64).

Another precaution in handling cutting tools is to dress the cutting edge carefully before plating. It should be made free from any slight burring or feathering; this may be accomplished by a slight honing operation, by hand, using a fine stone.

A few of the more commonly plated cutting tools deserving special comment are described in the following.

Twist drills are chromium plated over their full length. The flutes should be completely covered with chromium. With the plate so thin (0.00005 to 0.0005-inch as discussed above) generally the drill needs no special sizing. Before being put into use the drill should be dressed to remove chromium from the point and to provide proper clearance on the back faces. The drill is sharpened as required, and one plating should last the life of the drill.

Reamers Take Heavier Plating

Reamers are usually plated all over and then ground to proper size and clearance. The grinding leaves chromium on only the face of each blade. The plate thickness on reamers may run a little heavier than on other cutting tools, from about 0.0001 to 0.0005-inch.

Files are given thin deposits and plated only enough to give complete coverage. The current required depends to some extent on the condition of the file; a current density of 4 to 6 amperes per square inch of superficial area is recommended for about a 5-minute plating time at 100 to 120 degrees Fahr. Heavy deposits dull the file and should be avoided. The files are ready for use as plated except for the stress relief heat treatment that should follow the plating.

Broaches, milling cutters, gear cutters, knives, threading dies, taps, and thread chasers are all examples of cutting tools commonly chromium plated. The general comments and suggestions at the beginning of this section apply to these tools.

Burnishing bars should be given a deposit of 0.002 to 0.003-inch, although deposits as light as 0.0005-inch are sometimes used. The plate should be finished smooth by grinding, lapping, or buffing, and the bar should be given a stress-relief heat treatment.

For most pump shafts, a chromium

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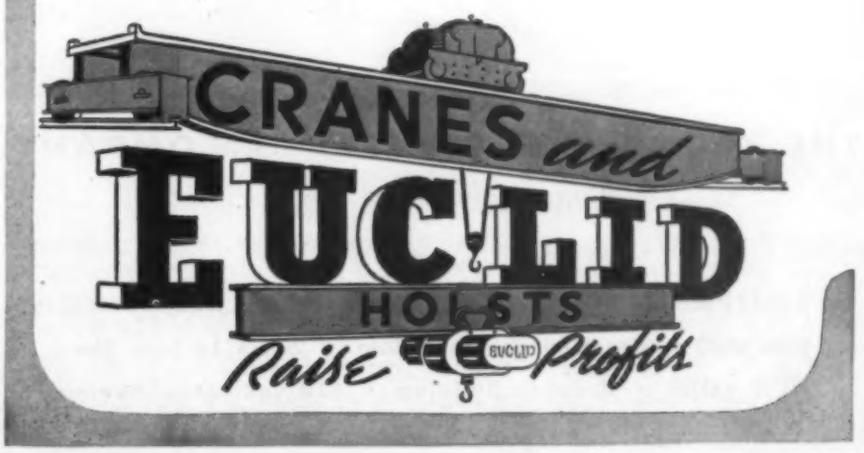

CHASING RAINBOWS?

Industrial progress has always started with ideas, with visions that may seem to be unreachable. Chasing rainbows is a perfectly proper function of industrial planning—*if* it is tempered with common sense and judgment.

We shall inherit from war production a wealth of new materials and techniques, which will make possible the building of better, more efficient and less costly manufactured products.

Many of today's models will become obsolete. However, their ultimate successors, as envisioned by practical "rainbow chasers", will not arrive overnight. They must first be tested and proved and improved—a process that requires time.

Industry will have an almost infinite choice of materials and methods for postwar products. But remember that word "choice". Selection is not automatic; alternatives must be studied, and decisions based on sound, provable engineering facts, always tempered by cost and ultimate selling price.

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plate thickness of 0.0005 to 0.0015-inch is satisfactory; but for use under high-pressure packing, heavier deposits should be applied, about 0.003-inch thick. On large shafts, the work may be plated oversize (about 0.005-inch thickness) and ground back to size. The finish in all cases should be smooth, preferably buffed to a high luster.

Pump plungers, rods and rams are handled in much the same way as pump shafts. The plate thicknesses may run higher, 0.005 to 0.010-inch, and in extreme cases as high as 0.100-inch. All bearing surfaces of this type running against packing should be finished very smooth before use.

There are many hydraulic parts chromium plated, most of them similar to pump shafts or rams in plate requirements. Where they run through packing and a deposit of 0.0005 to 0.00015-inch is satisfactory, they may be plated to approximate size and buffed. Where they function inside a cylinder with close tolerance, they should be plated to oversize and ground to size, with a residual plate of 0.001 to 0.003-inch in thickness.

Many Machine Parts Plated

The many machine parts regularly chromium plated include cams, feed screws, spindles, lathe centers, crossheads, guides, and similar pieces. For the most part, these take approximately 0.0005 to 0.003-inch in thickness, finished smooth to these dimensions by grinding or lapping to size after plating.

Steel engraved printing surfaces require a deposit of only 0.0002 to 0.0005-inch for good service. Heavier deposits should generally be avoided to prevent loss of detail in finely etched areas.

Corrosion-Resistant Applications: In a number of the wear-resistance applications outlined above, corrosion resistance is also an important factor. Protection of the molding die surfaces against pitting and erosion is very important; and on pump shafts, rods and plungers, resistance of the chromium to corrosion from the packing or material handled contributes in an important way to the successful performance of the plated member. There are many applications where the opposite condition obtains—where the part is chromium plated primarily for corrosion resistance, and wear resistance though possibly important is a lesser consideration in using the chromium plate.

The plate thickness used for corrosion resistance applications varies over wide limits, from 0.0002 to 0.0005-inch for bearing rollers operating in oil, to 0.010 to 0.015-inch or more on large rolls and operating equipment. The applications for corrosion resistance are numerous and varied and include press plates, calendar rolls, table rolls, graining rolls, coating

rolls, lehr rolls, drying rolls and drums, chemical handling and mixing equipment, tanks, food processing equipment, oil refinery equipment, and numerous other pieces of industrial equipment, besides a number of engine and machine parts.

Salvage Applications: The number of salvage applications is practically unlimited. Salvage plating includes articles of all sizes and shapes, representing parts worn out in service as well as parts machined off-size in fabrication. Obviously, the thickness requirements in such applications are determined by the amount the part is off-size, except where the maximum plate thickness that will function satisfactorily is less than the amount the undersize part has to be built up.

The information on deposit thicknesses and plate treatments as given in the foregoing illustrates the statements made earlier regarding limitations to specifications on chromium plating for engineering use. Hard and fast recommendations on plate thickness can hardly be made for a single type application, let alone a specification to cover the many and diverse applications of chromium plate in its engineering uses. It is possible, however, to give information of a general nature for the various uses, to serve as a guide to final determination, by trial, of the best practice for each individual case.

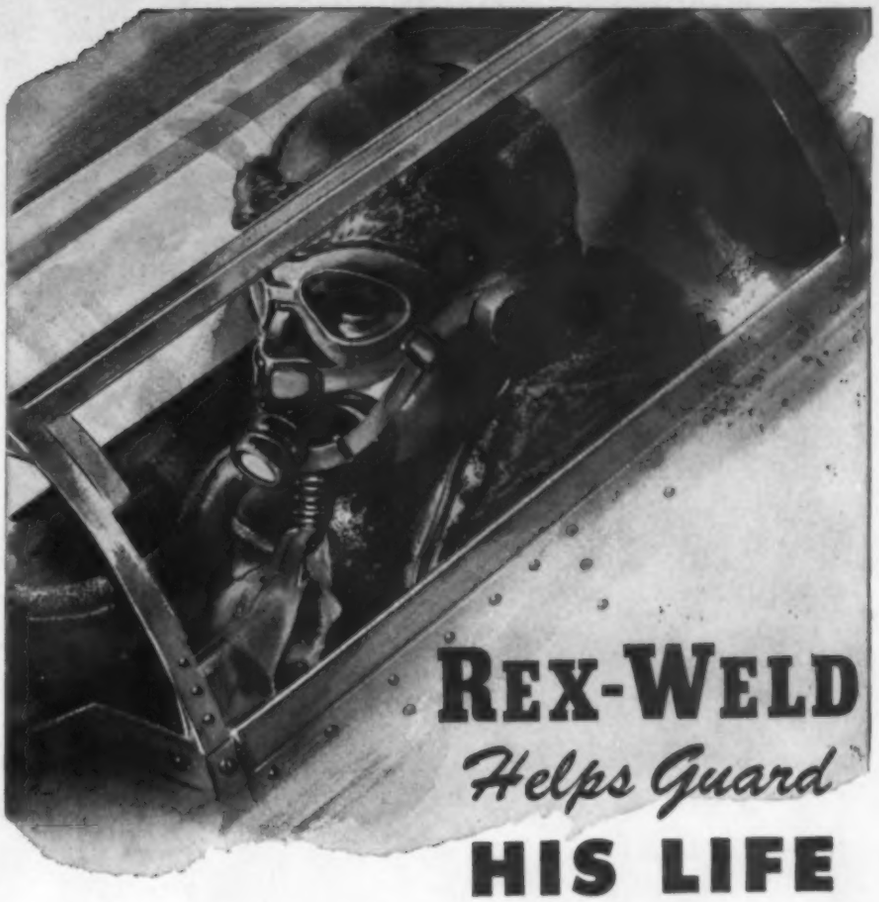
It is believed that the above recommendations and suggestions may serve this purpose.

Chemical Spray Booth Agent Recovers Quality Paint

Paint overspray collected from water-wash curtain spray booths now can be recovered in a high quality state with the use of a chemical compound, Turco Deflocculator, it was discovered recently by Turco Products Inc., Los Angeles.

When the chemical was originally developed as a treatment for circulating water systems in paint spray booths, its sole purpose was to prevent breaks in the water curtain by emulsifying oil and resinous vehicles, and dispersing pigments so they would not deposit on the metal walls of the spray booth.

Now without changing the method or directions for using the compound, the product serves a double duty. At the same time that the dilute solution of the compound is acting to prevent breaks in the water curtain and maintaining an unbroken sheet, it also serves as a chemical recovery agent. By preventing the formation of scum on top of tanks, the chemical aids in producing a higher quality of sludge which stays smoother and is dispersed much easier after reclaiming.



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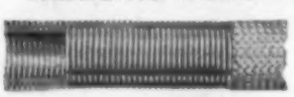

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Gas Cooler Aids Annealing, Drawing Operations

To permit better controlled conditions and improved annealing, drawing, tempering and stress relieving operations, Brown Fintube Co., Elyria, O., has developed a new gas cooler. Used between two furnaces, the cooler receives hot gases from one furnace at a temperature ranging from 1200 to 1600 degrees Fahr. while this furnace is on the heating cycle, and reduces their temperature to any desired level, even to 200 degrees Fahr. or lower. The cooled gases are then continued into the second furnace, permitting the work in this furnace to be annealed, drawn, stress relieved, etc., at the exact controlled temperature which will produce the physical qualities desired.

Since the work is done in a nonoxidizing atmosphere, the result is a minimum of oxidation and surface scaling and with a much reduced time cycle, permitting the work to be cooled, withdrawn and the furnace put back in heat in minimum time.

After it has been recharged and put back on heat, gases from the second furnace are passed through the cooler and exhausted into the first furnace, permitting the work in that furnace to be drawn, annealed, stress relieved and the like at accurately controlled temperatures and in a nonoxidizing atmosphere, again producing the desired physical qualities in the finished work, minimizing oxidation, and speeding up the cooling cycle.

The coolers consist of a bank of resistance-welded integrally-bonded extended-surface fintubes, welded to headers at each end and mounted in an insulated steel housing or "shell". Water used for cooling, passes through the inside of the tubes. Gases are passed between the outside of the tubes and the shell. The use of welded, integrally-bonded fintubes provides the sturdy, durable construction needed to withstand the heat shock encountered in this service and assures the operation of the equipment at high thermal efficiency. In addition, the extended surface of these tubes, employing the desired number and depth of fins, permits the primary (or inside) and secondary (or outside) surfaces of the fintube to be proportioned to the heat transfer co-efficients of water and the products of combustion. This permits a fewer number, or shorter fintubes to be used for a given service than if plain bare tubes were used, resulting in a smaller unit, less weight, less back pressure and many other savings.

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GE Uses Worn Drills To Remove Paint from Centers

Paint and varnish are cleaned from shaft centers and small holes with center drills that become worn and dull, but which are not badly chipped or broken at one of General Electric's plants. Drills for the purpose are selected of the same size as the holes to be cleaned. The tool is placed in a small holder and turned by hand. The dull cutting edge scrapes off the softer material without scoring the metal. P. S. Boucher, a tool room man at GE, conceived the idea.

New Rust Preventative Dries in 25 Minutes

Providing a glossy thin film, a new hard drying rust preventative announced recently by E. F. Houghton & Co., 303 West Lehigh avenue, Philadelphia, is reported to dry in 25 to 30 minutes. Known as rust Veto 110A, it is a liquid which can be applied by brush or spray. Thickness of film it provides approximates 0.0003-inch.

When dry, the coating is noninflammable. It is reported to have a strong adhesion to metal even after being subjected to soaking in water for 24 hours.

Unified Drives

(*Continued from Page* 122)

shown in Fig. 2. The roughing mill motors A, B, C, and D, are connected to generator G1. Ward Leonard control is used for starting these four motors and for adjusting their speed as a group. Each machine is connected to the bus through one or two electrically-operated circuit breakers or contactors. Each motor can be quickly stopped by tripping its circuit breaker or contactor and applying dynamic braking. Each mill stand motor is provided with its field rheostats for coarse and fine adjustment of speed.

Arrangement Flexible

Motors G, H, and J are similarly connected to generator G2 which normally also supplies motors E and F. However, as previously stated, provision is made for supplying motors E and F, one or the other, or both, from either generator G1 or G2. Control of these motors is identical with that of the motors A, B, C, and D. Motor J is also equipped with complete magnetic starting and dynamic braking control. Thus it will be possible to stop and restart motor J without affecting the motors driving the intermediate stands.

Voltages of generators G1 and G2 are controlled by a common potentiometer field type rheostat operating in conjunction with generator voltage regulators, one for each generator and its related 600-volt bus section. The arrangement of connections is such that the voltage of each generator is independently regulated and controlled, even though a common potentiometer rheostat is used simultaneously raising and lowering the voltages of G1 and G2.

Control of all mill drives is centralized in a desk located in the operator's pulpit overlooking the mill (Fig. 5). Generator voltage, motor speed, closing, and tripping of machine breakers and contactors is controlled from this desk. Necessary safety interlocking is included with the control, greatly simplifying the task of the pulpit operator. The desk is equipped with an ammeter and speed indicator for each motor.

Vernier, or fine adjustment, rheostats for motors, A, B, C, and D, are motor operated, as it was considered advisable to have the speed of these four motors adjustable not only from the pulpit but also from the mill floor. A control cabinet located at Stand No. 1 is provided for this purpose. The vernier rheostats for drives E, F, G, H, and J, however, are lever-operated.

Contemplated generator voltage range used for speed adjustment of the mill drives is 450 to 600 volts. This voltage

NOTE:
Baker has re-designed many of its trucks to meet Industry's needs for increased production:
1. Longer continuous operation
2. Faster handling of material
3. Lower maintenance

● The same advantages which have been designed into these trucks to speed the production of war goods also apply to normal peacetime material handling. The model illustrated, designated as Type H-3, is of 6,000 lb. capacity.

Improvements include a new hydraulic lift system which provides efficient, positive control of hoisting and lowering, increased battery compartment permitting longer continuous operation, operator's guard integral with frame for greater strength and safety, and other features which provide increased efficiency and easier maintenance ...The new improved design is also available in 4,000 lb. capacity. (Type H-2.)

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Controller, contactors, lift motor and pump are grouped together in a convenient control panel. Travel brake is easily adjusted by a single hex nut. Operator's guard built integral with frame for greater strength, provides handy compartment for carrying towing chain, pinch bar, or other tools

Easy steering results from proper design and anti-friction bearings on king pins. All steering levers and rods are inside frame, protected against damage. Frame members are fabricated of heavy plate by hot riveting and arc welding.

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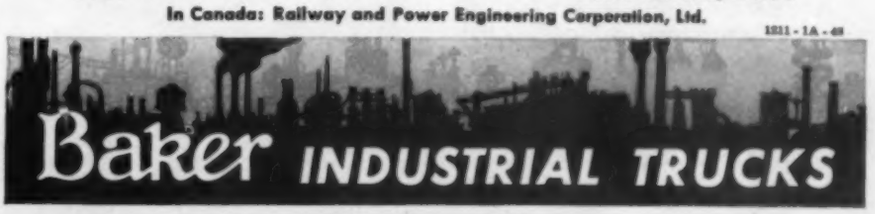

may be held, of course, at different values at the two bus sections. Once adjusted, these voltages are held constant by means of two voltage regulators acting on the generator fields through suitable generator field exciters. This close voltage regulation assists materially in maintaining constant pre-set speeds of the mill drives.

In case of an emergency, a tie can be closed between the two 600-volt bus sections by circuit breakers, thus enabling the generators G1, shown in Fig. 1, to be controlled with generator G2. When the bus sections are tied together only one voltage regulator serves the installation.

An instrument panel is provided as a part of the main control board located in the motor room. This panel provides a recording ammeter for each 600-volt generator and mill stand motor. All of these recording instruments are mounted in a central location and means are provided for simultaneously increasing the chart speeds of all the recording instruments from "3 inches per hour" to "3 inches per minute" for making simultaneous load tests. A test pen is also provided on each instrument for making the chart. An unusual feature is that marks can be made simultaneously on all charts, and the speeds of all charts simultaneously increased, through the manipulation of master switches.

Switchgear equipment for the control and distribution of the 250-volt direct-current and the 440-volt alternating-current auxiliary power supply is also located in the motor room.

Twenty-Three Extra Motors Used

In addition to the main drive equipment and exclusive of the small alternating-current motors required for driving ventilating fans and other miscellaneous purposes, a total of 23 direct-current motors having capacities up to 40-horsepower is used to drive the various auxiliary apparatus. The auxiliary power-driven mechanisms consist of the various conveyors, feed reels, pushers, etc., mechanisms for mill traverse adjustment, and mechanisms used in connection with handling the reels at the pouring and laying reel locations, and for driving the coil conveyor.

Most of these motors are of the totally-enclosed, heavy-duty, direct-current mill type. The magnetic control required for these motors is located at two points. The control facilities for the auxiliaries in the vicinity of the furnace are housed in a small separate room, and the greater quantity of control panels required for the other auxiliaries are housed in a larger control room located on the mezzanine floor above the mill and opposite the motor room.

Two secondary control desks are used for the control of the auxiliaries required for handling the reels. One desk, which is designated "Pouring-Reel Pulpit," is located in the vicinity of the pouring-reel, and the other desk, which is designated "Laying-Reel Pulpit," is located in the vicinity of the laying-reels. These desks mount the manually-operated facilities and indicating instruments for the control and speed adjustment of the auxiliaries in the two locations. The coil conveyor motor is controllable from either the pouring-reel or the laying-reel pulpit.

New Manufacturing Method Improves Locking Nuts

Faster production and lighter weight locking nuts for use in aircraft are resulting from a new manufacturing development which fabricates these nuts from sheet aluminum, the Rumsen Co., 8059 Melrose avenue, Los Angeles, reveals. Tests under actual working conditions have shown the new locking nuts to be as strong as those machined.

According to the company, the new method of manufacturing, which was not revealed, also is instrumental in saving critical materials.

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Grinding Carbide Tools

(*Continued from Page* 114)

better cooling. If the finishing must be done dry, be extremely careful to keep the wheel sharp enough so that no heat coloring shows on the tip or shank at any point.

In finish grinding it is best to use the face of a cup wheel as shown in the illustrations. The top of the tip is ground first, setting the table rest at the finished side rake angle desired.

To grind the end of the tool, set table rest at the finished front clearance angle desired. If the clearance on the tip is made 2 to 4 degrees less than the clearance on the shank, the wheel contact will be on the carbide tip only, reducing the grinding time and preventing the wheel from "loading up" with steel.

Grinding the side clearance and side cutting edge angles is the last step in finish grinding tools. As in roughing, wet grinding is preferred. Tool radius is formed by rotating the tool from the side cutting edge to the end cutting edge, blending the radius tangent to the side and end cutting edges.

Diamond impregnated bakelite wheels of 220 grit are very satisfactory for finish grinding. Honing sometimes will increase tool life on light cuts.

Rigid Grinding

When grinding steel-cutting carbide tools in a magnetic chuck or rigid fixture, resinoid bonded diamond wheels of high concentration are recommended.

A light vertical feed per pass is advisable to insure long wheel life and freedom from checks in the tool. The diamond grit is harder than the carbide and will cut it if passed across the carbide surface, but the wheel bond is much softer than the carbide and must be "protected" by its studding of diamond particles. A 100-grit wheel has grains about 0.0045 to 0.0050-inch mean diameter, which must be imbedded at least three-fourths of that distance in the bonding matrix, leaving less than 0.001-inch of "cutting edge" projecting. Just as a tool with a ¾-inch long tip would not be used on a 1-inch deep cut, a wheel with 0.001-inch maximum "cutting edge" length should not be used as a "depth of cut" over 0.0005-inch if allowance is made for some wear of the diamond grains.

Fortunately diamond wheels cut carbide readily at high table speeds, so that the combination of 0.0005-inch feed per pass with a rapid table motion results in fast grinding.

Improper Grinding Weakens Tools: Breakdown of a crazed tool usually occurs while in the cut and sometimes ap-

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pears to have broken from too high a cutting pressure. Since this type crack seldom can be seen even under fairly high magnification and since breakage occurs while the machine is being operated, even the most experienced men fail at times to give the correct reason for this tool breakdown.

Several things may cause tool breakdown:

The crazing and subsequent weakening of a tip surface may be caused by suddenly overheating the tip surface while the interior remains cool. Checking or crazing may therefore be caused through the use of any alundum wheel, a silicon carbide wheel of too hard a bond, or a low concentration diamond wheel. A tool crazed on the broad top surface of the tip will sometimes lose a section back of the cutting edge where there is apparently no strain.

Crack Caused by Snagging Shank

The second, larger type of crack is caused by the difference in expansion of the steel shank and the tip, and usually appears parallel to a brazed surface and near to it. This crack usually is caused while snagging away the shank steel below the tip. When a tool shank becomes blue from the heat of grinding, a crack is probably in the tip, although it may not show up until the tool is in use.

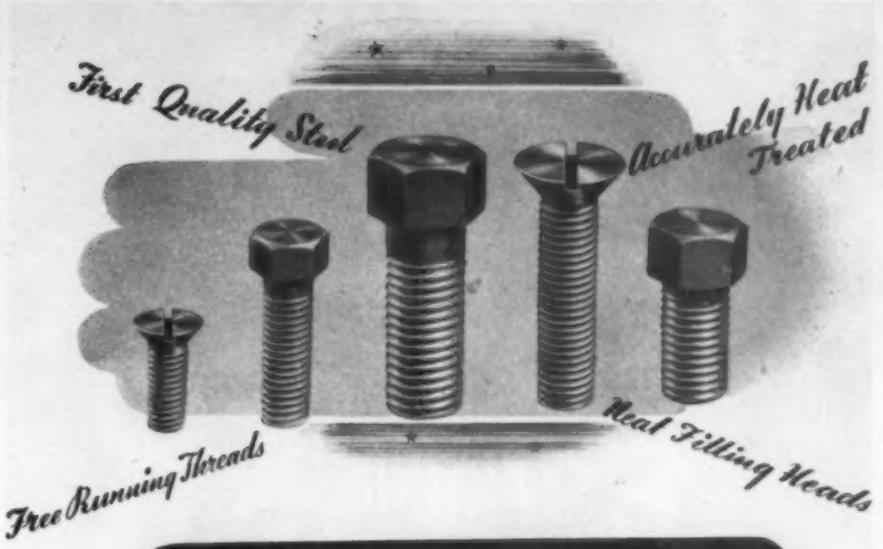
This type of crack can be caused also by too rapid cooling of the tool after grinding or by an interrupted flow of coolant while cutting.

Grinding with diamond wheels should be restricted to the carbide insofar as possible, as the comparatively soft steel shank loads up the wheel necessitating frequent dressing and causing more rapid wheel wear.

A good grade of diamond wheel properly used in grinding cemented carbide has a surprisingly long life.

Thermal Strains: Steel-cutting cemented carbides have approximately half the thermal expansion rate of the steel shanks to which they are brazed. This creates excessive tensile strains in the carbide when both tips and shanks are heated equally. When the steel is being roughed away under the tip, the condition is even worse as the steel is at a much higher temperature than the carbide.

Steel-cutting cemented carbides also have lower heat conductivity grades for cutting cast iron. This is an advantage in cutting, as it throws the heat into the steel chips, but care must be taken during grinding to avoid overheating an edge or surface while the balance of the carbide is cooler. Such localized heating tends to tear the overheated surface away from the mass, caus-



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ing a network of fine hair-line cracks or checks.

The logical way to prevent either of the above types of thermal strain is to keep the surface being ground cool at all times by an adequate flow of coolant on the tool and wheel. The flow must be adequate, however, for while a dry grinder is not desirable, a "damp" grinder is almost as bad and may be worse.

How to Avoid Cracks: Follow these grinding instructions to get full life from your steel-cutting carbide tools:

—Always wet grind the tools at 4300 to 5500 surface feet per minute.

—Use a 60-grit silicon-carbide soft-bond wheel for roughing and 90 to 120-grit wheel for finishing.

—Keep wheels dressed with a star dresser.

—Use sufficient coolant in a full, steady flow.

—Constantly move tool back and forth across the wheel.

—Use resinoid bonded diamond wheels when grinding in a rigid fixture or magnetic chuck.

Brush-Applied Coating Strips Off by Hand

A temporary protective coating which forms a thin film that can be stripped off the part easily without the use of any chemicals is announced by Insl-X Co., Brooklyn, N. Y.

Applied by brush or by dipping, the coating air-dries in a maximum of 15 minutes depending on atmospheric conditions. It covers all finishes from rough to smooth, it is said and covers all edges on complicated forms without flowing away. The coating has withstood 100-hour 3-per cent salt-spray tests on steel, copper, brass and aluminum without any effect, the company reveals. It is being offered in two forms—for short and long-term protection.

New Directory Covers Steel, Metal Industry

Standard Metal Directory, 1943; cloth 702 pages, 6 x 9 inches; published by Atlas Publishing Co., 133 West Twenty-first street, New York, for $10.

This is the ninth edition of this directory, which covers a wide variety of information in the metals field. It contains a descriptive list of iron and steel plants, foundries, metal rolling mills and metal smelters and refiners.

There also are lists of practically all producers and handlers of new and scrap metals, and second hand materials in the metals field.

Lists are arranged alphabetically by cities in each state and names are readily found.

Controlled Materials Plan Filling War Needs

(*Concluded from Page* 81)

controlled material orders. This provision has worked a distinct hardship on individual small consumers who have no means of furnishing authorized controlled material orders. A simple procedure which would permit the prompt allotment of small amounts of steel, copper and aluminum in controlled material form to individuals is deemed desirable.

Permission to make advance allotments probably will be liberalized to further facilitate long-range production scheduling. The present flexible system permits claimant agencies and industry divisions to make advance allotments up to July, 1944, on firm production schedules. Some claimant agencies may grant up to 100 per cent of their current total allotments while others are restricted to smaller percentages.

All industries using controlled materials must file WPB-732 quarterly. It incorporates CMP-7 and requires a report on inventories of critical materials, products manufactured, shipments of products, etc. Filing of this form has not been satisfactory and it may be found necessary when sending out WPB-732 the next time to advise industry that CMP-4A's, B's, or C's will be denied if the applicant has failed to make a proper report on WPB-732.

While further refinements will be made in CMP the value of any major change would be nullified by the adverse effect on confidence of industry in the stability of the plan as well as by disruption in the ordered movement of materials until the change could be firmly granted by all affected divisions.

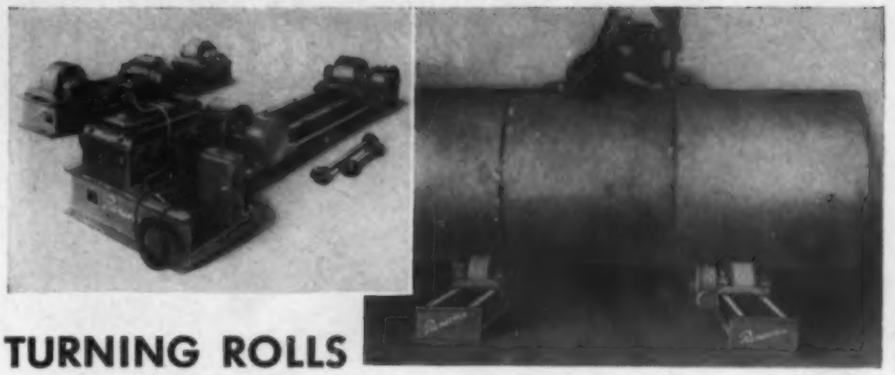
Foundry Equipment Sales Index Declines in July

Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed on new equipment in July was 320.9, compared with 355.6 in June and 274.3 in May.

Total sales index was 379.4 in July, 413.6 in June and 348.9 in May. Index for repairs in July was 577.0, in June, 609.2 and in May, 573.7.

Use Old Steel Rails To Build Sand Filter Plant

Steel rails from abandoned Costa Rican banana plantations are serving again in the building of a sand filter plant to supplement the drinking water supply of San Jose, Costa Rica.



TURNING ROLLS
CAN STEP UP YOUR CYLINDER WELDING...

For manual or automatic welding . . . here's the equipment that will enable your welders to produce at their top capacity. Smooth rotation at any desired speed . . . forward or reverse . . . is provided by a variable-speed drive with push-button control.

Work ranging from 2 to 14 feet diameter can be accommodated by shifting the position of the rollers.

Other Ransome Positioners include types and capacities for handling weldments of any size.

POSITIONING PAYS...WRITE FOR LITERATURE

Ransome WELDING POSITIONERS
INDUSTRIAL DIVISION • RANSOME MACHINERY COMPANY • DUNELLEN, NEW JERSEY

NATIONAL STEEL

Hanna Pig Iron

KNOWN NAME IN IRON

GRADES:
Basic
Foundry • Silvery
Malleable
Ferro-Silicon

THE BEST

BRANDS:
Buffalo • Detroit
Susquehanna

The Hanna Furnace Corporation
MERCHANT PIG IRON DIVISION OF
NATIONAL STEEL CORPORATION
Buffalo Detroit New York Philadelphia Boston

All Wisconsin Air-Cooled Engines are equipped with an exceptionally rugged, oversize crankshaft (as compared with other engines of comparable size) . . . drop-forged for maximum molecular compactness and ability to withstand the terrific pounding to which this vital unit is subjected in heavy-duty service.

Because the burden of heavy-duty engine operation falls on the crankshaft, we feel that no crankshaft can be made "too good". We build them as good as we know how.

MOST POWER Per POUND

WISCONSIN MOTOR Corporation

MILWAUKEE, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

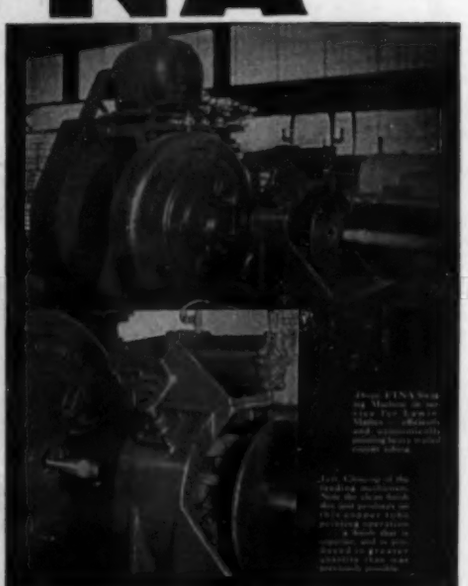
LEWIN-MATHES *Got the right answer at*

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY

TOLEDO OHIO

WPB Announces Formation Of Advisory Committees

(*Concluded from Page* 81)

son, N. J.; A. J. Langhammer, president, Amplex division, Chrysler Corp., Detroit; B. H. Newell, assistant manufacturing manager, Buick Motor division, General Motors Corp., Detroit; Randolph J. Roshirt, general manager, Bohn Aluminum & Brass Corp., Detroit; A. Rossett, sales manager, Chicago Aluminum Castings Co., Chicago; Harry L. Smith Jr., product manager, Aluminum Co. of America, Cleveland; Karl A. Stein, president, Acme Pattern & Tool Co. Inc., Dayton, O.

Automotive Maintenance Equipment

Government presiding officer is J. J. Donovan. Committee members are: Victor Allen, Automotive Maintenance Machinery Co., North Chicago, Ill.; C. R. Crowder, Van Norman Machine Tool Co., Springfield, Ill.; Victor B. Day, Bear Mfg. Co., Rock Island, Ill.; W. A. Douglass, Sunnen Products Co., St. Louis; Leo Edelmann, E. Edelmann & Co., Chicago; Charles F. Hodgson, Weaver Mfg. Co., Springfield, Ill.; L. B. Miller, L. B. Miller Co., Brooklyn, N. Y.; B. M. Muchmore, A. Schrader's Son, Brooklyn, N. Y.; John A. Murname, Noera Mfg. Co., Waterbury, Conn.; Ira Saks, Accurate Parts Mfg. Co., Cleveland; Frank J. Schwab, Lempco Products, Inc., Bedford, O.; Newell P. Weed, Heyer Products Co. Inc., Belleville, N. J.; K. R. Wilson, K. R. Wilson Co., Buffalo; L. F. Woolman, Allen Electric & Equipment Co., Kalamazoo, Mich.; L. F. Working, Clayton Mfg. Co., Alhambra, Calif.

Platinum Group Metals Producers and Distributors

Government presiding officer is R. J. Lund. Committee members are: Sydney Cohn, president, Sigmund Cohn & Co., New York; H. Whitehead, Baker & Co. Inc., Newark, N. J.; R. Bayes, American Platinum Works Inc., Newark, N. J.; Marc S. Goldsmith, vice president, Goldsmith Bros. Smelting & Refining Co., Chicago; S. H. Headland, secretary, Wildberg Bros. Smelting & Refining Co., San Francisco; C. J. Johnson, treasurer, Goodnews Bay Mining Co., Seattle; W. C. Kerrigan, assistant sales manager, International Nickel Co., New York; Hugh Lehrfeld, owner, Kastenhuber & Lehrfeld, New York; J. A. Samuel, president, J. A. Samuel & Co., New York; C. W. Stones, president, Johnson, Matthey & Co. Inc., New York.

Beverage Machinery and Equipment

Government presiding officer is James F. Wallace. Committee members are: Henry Baffetti, Liquid Carbonic Corp., Chicago; William W. Burns Sr., Burns Bottling Machine Works Inc., Baltimore; B. J. Huseby, Sturdy-Bilt Equipment Corp., West Allis, Wis.; Arnold Jacobwitz, Niagara Filter Corp., Buffalo; Bruce Johnson, Automatic Pulp & Water Softener Corp., Rockford, Ill.; E. B. Knapp, Geo. J. Meyer Mfg. Co., Cudahy, Wis.; Charles E. McManus, Jr., Crown Cork & Seal Co., Baltimore; Herbert Nussbaum, Miller Hydro Co., Bainbridge, Ga.; Howard Stewart, Economic Machinery Co., Worcester, Mass.; Paul K. Wehmiller, Barry-Wehmiller Machinery Co., St. Louis.

Steel Boiler

Government presiding officer is William F. Bilyeu. Committee members are: James Axeman, Spencer Heater division, Williamsport, Pa.; J. F. Johnston, Johnston Bros. Inc., Ferrysburg, Mich.; John R. Collette, Pacific Steel Boiler division, Detroit; Fred Klein, Orr & Sembower Inc., Reading, Pa.; R. B. Dickson, Kewanee Boiler Corp., Kewanee, Ill.; Edward W. Mears, Mears-Kane-Ofeldt Inc., Philadelphia; Fred Hainer, Cleaver Brooks Co., Milwaukee; G. E. Olsen, Fitzgibbons Boiler Co. Inc., New York; L. N. Hunter, National Radiator Co., Johnstown, Pa.; Horace H. Peek Jr., Lookout Boiler & Mfg. Co., Chattanooga, Tenn.

Sodium Hydrosulphite Manufacturers

Government presiding officer is Morris R. Stanley. Committee members are: A. R. Chantler, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.; G. J. Desmond, Jacques Wolf & Co., Passaic, N. J.; Augustus H. Eustis, Virginia Smelting Co., Washington; D. S. Frederick, Rhom & Haas Co., Philadelphia; A. J. Royce, Royce Chemical Co., Carlton Hill, N. J.

Nothing but the best!

. . . for the BATTLEFRONT

THE entire Fairfield organization feels that those on the production front have a solemn obligation to produce only the finest equipment possible for those on the battlefront. The skilled operator pictured above displays the typical painstaking attention that Fairfield men devote to their jobs.

Although the bulk of Fairfield's production is spoken for far in advance, it is possible that we can help fill your gear requirements. It will be considered a privilege to answer your request for information.

TYPICAL PRODUCTS FOR WHICH FAIRFIELD FURNISHES GEARS

Military Equipment
Farm Machinery
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Tractors
Trucks
Diesel Engines
Machine Tools
Oil Field Equipment

FAIRFIELD for FINE GEARS

FAIRFIELD MFG. COMPANY
303 S. Earl Ave. • Lafayette, Ind.

Change Aircraft Steel Warehouse Rules

(*Concluded from Page 94*)

shipment cannot be made as scheduled, the warehouse will immediately notify the aircraft contractor, explaining the circumstances, so the contractor may immediately locate another source.

(2) *Release of Material from Warehouse Stocks*—In order to expedite the release of steel from earmarked aircraft warehouse stocks — when the quantity required is greater than that permitted in the Earmarked Stock Directive—the Aircraft Scheduling Unit has authorized materials co-ordinators in the district procurement offices to issue releases on all items, except steel tubing, which are required in quantities of 5 tons or less. For releases of quantities greater than 5 tons, it will be necessary to have the formal release made by Aircraft Scheduling Unit after certification of the emergency by the procurement district office.

(3) *CMP Regulation No. 2*—To assist manufacturers whose requirements for alloy steel—if specified over the period of their contract—would amount to extremely small quantities per month, the Aircraft Scheduling Unit has advised these contractors to utilize the provisions of the Controlled Materials Regulation No. 2, paragraph C3 of which permits an exception to the 60-day inventory restriction. Under this program, contractors may purchase up to the amount shown on schedule A attached to that regulation.

For example, a contractor with scheduled requirements for 300 pounds of 1-inch round alloy cold drawn bars per month for six months may place one order with a warehouse for immediate delivery of the entire 1800 pounds, since that amount is less than the 2000-pound maximum shown on schedule A for alloy cold finished bars.

Appoint Metallurgists To Aid Brazilian Miners

Three metallurgical experts have been appointed by the government to spend three months in Brazil lecturing and making field trips through mining areas at the request of the Brazilian government. Knowledge gained by this country's scientists is being used to help develop the reserves of metallic ores in Brazil.

The metallurgists appointed are Dr. A. Allan Bates, manager, chemical and metallurgical division, Westinghouse Research Laboratories; Dr. Robert Mehl, director, department of metallurgy, Carnegie Institute of Technology, and Arthur Phillips, professor of metallurgy at Yale university.

SPOT-WELDING OF ALUMINIZED STEEL

expedited with

safe, fast-working

OAKITE DEGREASING MATERIALS

Proper surface preparation is recognized today as one of the FIRST essentials in spot-welding aluminum-clad steel sheets successfully. ALL oil, grease, stamping and drawing compound, identification paint, oxide film and discoloration must be THOROUGHLY removed. Surfaces must be put in CHEMICALLY CLEAN, bright condition to reduce flashing and improve consistency.

But how are you going to meet these requirements easily? Many aircraft plants can give you the RIGHT ANSWER . . . and that is to use specially designed Oakite cleaning materials. You, too, will find they speedily and thoroughly remove all foreign matter . . . consistently produce low surface resistance that enables machine operators to make stronger, MORE UNIFORM welds . . . and turn them out on a FASTER schedule!

Technical Bulletin *FREE!*

Free to production and engineering executives, a 13-page technical bulletin completely describes the Oakite Surface Preparation Process for aluminized steel as well as for aluminum and aluminum alloys. Write for YOUR copy today!

OAKITE PRODUCTS, INC.
34E Thames St., New York 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE Buy Bonds for Victory
Specialized cleaning
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

AFTER 1,000,000 MILES

TOCCO-HARDENED CRANKSHAFT SHOWS ONLY 1/1000-INCH WEAR!

ONLY 1/1000-inch wear on the crankpins after piling up a service of 1,000,000 miles . . . a distance equal to 40 times around the world! That's the record of one veteran TOCCO-hardened crankshaft on one of the country's fastest streamliner trains. Hundreds of thousands of other TOCCO-hardened crankshafts are giving similar performance . . . giving 5 to 10 times normal life . . . avoiding delays for engine overhauls . . . keeping engines of the United Nations on the straight path to Victory.

TOCCO-hardened crankshafts are used by the firms listed.

Investigate TOCCO for improved and faster hardening, annealing, brazing and heating.

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

THESE ENGINE BUILDERS USE *TOCCO*-HARDENED CRANKSHAFTS

Caterpillar Tractor Company

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Seven divisions making trucks and diesel engines.

Hercules Motor Corp.

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and many others.

TOCCO

World's Fastest, Most Accurate Heat-Treating Process

HARDENING
ANNEALING
BRAZING
HEATING for
forming and forging

New Buying Wave Expected As Next Year's Needs Appear

First and second quarter allotments increase and mills are sold well into 1944. . . Railroads given larger steel supply. . . . Auto builders seek postwar tool equipment

DEMAND
Extended into second quarter.

PRODUCTION
Up ½-point to 99 per cent.

PRICES
Charcoal pig iron advanced.

INCREASED buying of steel in September is expected as allotment numbers for first and second quarter delivery become more freely available. Sheet and plate producers, in particular, report increasing tonnages for second quarter delivery and are concerned over bookings so far deferred as they are likely to be subject to considerable revision as the war situation changes from month to month.

Volume of buying in August was less than in July, attributed to heavy plate tonnage placed in July when the month-to-month buying under PRP was succeeded by extended covering under CMP. This was so heavy that by the end of July most producers were sold to the end of the year, with some accumulation into next year. This rush to cover declined during August.

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Carbon bar producers in general are booked solidly through January in most instances and orders for second quarter are appearing in substantial volume. Hot-rolled alloy bars are in easier position and it is possible to obtain November delivery. Cold-drawn bar producers are pressed for deliveries, particularly on hexagons, aircraft manufacturers requiring so much of these sections that the ordinary ratio to rounds and flats is completely upset. Some producers are booked through first quarter, while on ordinary sizes of rounds January delivery can be obtained.

While revision of bar schedules has improved delivery on some most needed items the general situation has not improved. Some forging shops have canceled orders and placed others for later delivery, inventory situation making this possible.

Sheet buying in August was lighter than in July in the experience of most makers, but demand has increased recently. A factor is a substantial tonnage of cold-rolled for blitz cans, said to number 11,000,000 containers, production starting in December and continuing through first half, divided among a number of fabricators. Special directives may be necessary to provide sheets for this purpose as cold finishers are booked through the year and in some cases into February.

Although platemakers are booked far ahead, many through February, the heavy tractor program which is scheduled to get under way about the end of the year is expected to bring out further plate tonnage. One interest is reported to have been given a contract for 8500 tractor units, with others sharing in the awards. Railroad equipment builders have figured on some of this business, to replace cancellations in combat tanks, as the manufacture of the latter is concentrated with larger automotive companies.

Steelmaking operations last week edged forward ½-point to 99 per cent of capacity, highest since the end of May. As the percentage applies to a larger capacity basis this means a greater tonnage. Pittsburgh gained 1 point to 99½ per cent, Chicago ½-point to 99½, Cincinnati 2 points to 94 and Detroit 7 points to 90 per cent. St. Louis declined 16 points to 73 per cent as a strike stopped production in an entire open-hearth department. Wheeling dropped 5 points to 98 per cent, Cleveland ½-point to 94 per cent and New England 5 points to 92. Rates were unchanged as follows: Buffalo, 90½; eastern Pennsylvania, 95; Birmingham, 95; Youngstown, 98.

♦ ♦ ♦

Permission by OPA for producers of Lake Superior charcoal pig iron to increase prices from $28 to $34 per ton, f.o.b. furnace, will relieve them of heavy loss as expense of production has increased greatly. In recognition of this situation the order is made retroactive to July 1, thus applying to two months already past.

Equipment allocation for railroads under the more liberal policy of the War Production Board continues to bring out inquiries for additional freight cars. Placing of car orders approved by WPB in August probably is the largest since January and indicates the need which has been growing more pressing during the months when buying was tabooed.

Automobile builders are in the market with inquiries for machine tools for postwar use, seeking favorable position on order books when their normal production can be resumed. This foresight is expected to speed reconversion to peacetime production. Machine tool builders are not making definite commitments as to price or delivery as there is no certainty as to how long OPA ceilings may remain in effect. Backlogs of tool builders are dwindling and orders are at the lowest level since the start of the war program, though pressure for delivery continues strong.

Average composite prices of steel and iron products continue unchanged, reflecting ceilings imposed by Office of Price Administration. Finished steel composite is $56.73, semifinished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Sept. 4	Aug. 28	Aug. 21	One Month Ago Aug., 1943	Three Months Ago June, 1943	One Year Ago Sept., 1942	Five Years Ago Sept., 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$58.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	36.60
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	19.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	14.35

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Sept. 4, 1943	Aug., 1943	June, 1943	Sept., 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.48	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{5}{16}$-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	Sept. 4, 1943	Aug., 1943	June, 1943	Sept., 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.36	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2 fdry., del. Phila.	25.84	25.89	25.89	25.89
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.65
Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting, steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.75	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill. Kaiser Co. Inc. $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncropped, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36; Duluth (bil.) $36.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40. Detroit, del. $42; Duluth, billets only, $42.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O.

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section: 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over, $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, Galveston, No. 5—9/32 in., inclusive, per 100 lbs., $2. Do., over 9/32—47/64-in., incl., $2.15.
Worcester add $0.10; Pacific Ports $0.50.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Mahoning Valley 2.22½c; Detroit, del. 2.25c; Eastern Mich. 2.30c; New York del. 2.49c; Phila. del. 2.47c; Gulf Ports, dock 2.52c; Pac. ports, dock 2.80c. (Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.20c; Eastern Mich. 2.25c; Phila. del. 2.27c; New York del., 2.34c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.67c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific Ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c; Granite City, base 2.85c; Detroit del. 2.85c; Eastern Mich. 2.90c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Detroit del. 3.45c; Eastern Mich. 3.50c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	....
65	7.15c	7.90c	....
58	7.65c	8.40c	....
52	8.45c	9.20c	....
U.S.S., R.C. Grade	10.10c	....	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.45c; Eastern Mich. 3.50c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate, Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.29c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.45c.

(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.27c; Phila., del., 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth):

Bright basic, bessemer wire 2.60c
Spring wire 3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.55; Pacific ports 3.05c
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.05c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.40c
Woven fence, 15½ gage and heavier, per base column ..... .67
Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Pipe, Tubes

Welded Pipe: Base price in carloads, threaded and coupled, to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	29	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	....	....
1¼"	13	9.26	10.67	....	....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.03	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	....
2¾"	12	17.54	20.21	16.58	26.57
3"	12	18.39	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Track bolts, 4.75c; do. heat treated, 5.00c. Tie plates, $43 gross ton, base.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	.	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	....	....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	....	§§18.00	19.00	....	....

*With 2-3% moly. †With titanium. ‡With columbium. ** Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

⅛ x 6 and smaller	65½ off
Do., ¼ and ⅜ x 6-in. and shorter	63½ off
Do., ½ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	....

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	7.25- 7.75
Wise county, furnace	6.75- 7.25

By-Product Foundry

Kearny, N. J., ovens	12.13
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic*	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.53	26.03	27.53	27.03
Brooklyn, N. Y., del.	27.50	.....	.....	28.00
Birdsboro, Pa., base	25.00	24.50	26.00	25.50
Birmingham, base	‡20.38	†19.00	.....	.....
Baltimore, del.	25.61	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	24.22	.....	.....	.....
Cincinnati, del.	24.06	22.68	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.15	.....	.....	.....
Philadelphia, del	25.46	24.58	.....	.....
St. Louis, del.	24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.10	24.60	25.60	25.10
Muskegon, Mich., del.	27.19	.....	.....	27.19
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.31	25.81	26.81	26.31
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.63	26.13	27.13	26.63
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	25.99	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.84	25.34	.....	26.34
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%; 50c deduction under 1.75%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese over 1.00%.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $23.50
Valley, base 23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.74, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $2 per ton, effective May 20, 1943. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices	
Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	56.90
Birmingham, Ala.	51.30
Ladle Brick (Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60% $30. (After Aug. 29 base price any grade $30.)

Ferroalloy Prices

Ferromanganese (standard): 78-82% c.l. gross ton, duty paid, eastern, central and western zones, $135; add $6 for packed c.l., $10 for ton, $10.50 less-ton; f.o.b. cars, New Orleans, $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33. Ferromanganese (low and medium carbon): eastern zone, low carbon, bulk, c.l., 23c, 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c, 2000 lb. to c.l., 24.40c; medium, 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, bulk, c.l., 79.50c, 2000 lb. to c.l., 80c; central, 81c and 82.50c; western, 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c —low carbon, eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.-50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. to c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr.

Briquets: Ferrochrome, containing exactly 2-lb. Cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 to c.l., 8.75c; silicomanganese briquets, containing exactly 2 lb. manganese and ¼ lb. silicon, bulk, c.l., 5.80c, 2000 lb. to c.l., 6.30c; ferrosilicon briquets, approximately 5 lb. and containing exactly 2 lb. of silicon, or weighing approximately 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, ferrochrome, .3c for c.l. and .5c for 2000 lb. to c.l.; silicomanganese, add .25c for c.l., and 1c for 2000 lb. to c.l.; ferrosilicon, add .15c for c.l. and .40c for 2000 lb. to c.l.; western, ferrochrome, add .70c for c.l. and 2c for 2000 to c.l., silicomanganese, add .55c for c.l. and 2c for 2000 lb. to c.l., ferrosilicon, add .30c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $59.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk, c.l., 6.65c and 2000 lb. to c.l., 7.85c; central, 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 97% and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicomanganese: Max. 1.50 carbon, bulk, c.l., eastern zone, 6.05c, 2000 lb. to c.l., 6.70c; central, add .25c and 1.00c; western, .55c and 2.00c; f.o.b. shipping point, freight allowed; all prices per pound of alloy.

Manganese Metal: 96 to 98% manganese, max. 2% iron, eastern zone, bulk, c.l., 39.60c, 2000 lb. to c.l., 40c; central, 39.85c and 41c; western, 40.15c and 43.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 35.60, 2000 c.l., 36c; central, 35.85c and 37c; western, 36.15c and 39.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium: ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium Alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ½-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 9.50c; ton lots 10.00c, less ton lots, 10.50c.

Borosil: 3 to 4% boron, 40 to 45% si., $7 lb. cont. Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Coldrolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[13]	4.715	7.762[23]	6.062[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.665[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.072[21]	4.772	7.566[23]	5.866[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[25]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[19]	3.75[21]	4.66	7.35[23]	5.65[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.81[1]	4.65[15]	4.30[19]	3.65[21]	4.35	7.35[23]	5.65[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.75[21]	.....	7.45[23]	5.75[23]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.75[21]	4.45	7.556[23]	5.856[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[13]	4.500[24]	3.800[21]	4.659	7.680[23]	5.980[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[16]	5.443[24]	4.443[21]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[16]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[16]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[23]	5.85[23]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.85[15]	4.10[24]	3.65[21]	4.55	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	3.90[5]	3.95[5]	3.95[5]	5.71[5]	3.85[5]	4.10[5]	4.10[5]	5.25[11]	4.66[24]	4.31[21]	.....	.....	.....
Birmingham (city)	3.50[5]	3.55[5]	3.55[5]	5.83[5]	3.45[5]	3.70[5]	3.70[5]	4.75[10]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham (country)	3.40[5]	3.45[5]	3.45[5]	5.83[5]	3.35[5]	3.60[5]	3.60[5]	4.75[10]	4.78[24]	4.43[21]	.....	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[20]	4.95[10]	4.60[21]	5.00	.....	.....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[20]	4.95[10]	4.60[21]	.....	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[20]	5.43[10]	4.50[22]	.....	.....	.....
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[15]	7.15[9]	5.70[22]	.....	9.55[23]	8.55[23]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[10]	7.55[10]	5.55[22]	.....	9.80[9]	8.80[9]
San Francisco (country)	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[10]	7.45[10]	5.45[22]	.....	.....	.....
Tacoma	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.25[8]	5.45[8]	5.70[8]	6.63[24]	5.75[22]	.....	.....	.....
Seattle (city)	4.20[8]	4.45[8]	4.75[8]	6.50[8]	4.65[8]	4.35[8]	5.45[8]	5.70[8]	6.63[24]	5.75[22]	.....	.....	8.00[8]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in amendments Nos. 10 to 16 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base.

Ores

Lake Superior Iron Ore
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1	52.80
less $7 freight allowance	

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	100.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per G T	Bars per 100 lb.	Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.....	.....
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.13-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9253	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	.....	.....
NE 9261	.55-.65	.75-1.00	1.10-2.20	.10-.25	.....	.....	.65	13.00	.....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	.....	.....
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9545	.43-.48	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

					ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES									
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling, No. 1 chem. borings, 1 per cent oil, $1 under. No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati includes Newport, Ky. St. Louis basing point includes Granite City, East St. Louis and Madison, Ill. San Francisco includes South San Francisco, Niles and Oakland, Calif. Chicago includes Gary, Ind. Claymont, Del., includes Chester, Pa.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah, Arkansas, Nebraska, Kansas. Delivered price may exceed by not more than $7 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $7 the nearest basing point price. Colorado is remote for Colorado consumers only.

LOGEMANN Presses for Sheet Scrap

THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, **LOGEMANN SCRAP PRESSES** are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up **LOGEMANN** designs and workmanship.

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The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1¼c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 14.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 13.50c; No. 12 foundry alloy (No. 2 grade) 13.50c; chemical warfare service ingot (92½% plus) 13.50c; steel deoxidizers in notchbars, granulated or shot, Grade 1 (95-97½%) 13.75c, Grade 2 (92-95%) 13.50c, Grade 3 (90-92%) 13.00c, Grade 4 (85-90%) 12.50c; any other ingot containing over 1% iron, except PM 754 and hardeners, 13.50c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1¼c 1000-2239, 2¼c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c; Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.13c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.61c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ¼c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more, plant scrap only. Segregated solids: S-type alloys (2S, 3S, 17S, 18S, 24S, 32S, 52S) 9.00c, 10.00c, 10.50c; All other high grade alloys 8.50c, 9.50c, 10.00c; low grade alloys 8.00c, 9.00c, 9.50c. Segregated borings and turnings: Wrought alloys (17S, 18S, 32S, 52S) 7.50c, 8.50c, 9.00c; all other high grade alloys 7.00c, 8.00c, 8.50c; low grade alloys 6.50c, 7.50c, 8.00c. Mixed plant scrap, all solids, 7.50c, 8.50c, 9.00c; borings and turnings 5.50c, 6.50c, 7.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.ob. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ¼c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ¼c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

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Sheets, Strip . . .

Sheet & Strip Prices, Page 162

Broadly speaking, producers of both hot and cold-rolled sheets are booked up through January at least, although a little better can be done in some instances. Their position on galvanized sheets has also become noticeably extended, with relatively little tonnage left for delivery this year. Shipments on some specialties, such as electrical sheets and stainless steel, can be made in November and in the case of electrical sheets still earlier in some instances.

Sheet orders have picked up the past few days, although sellers generally report that August bookings were substantially lighter than in July. Recent demand includes a substantial tonnage of cold-rolled sheets, around 22-gage, for blitz cans. The program is scheduled to get under way in December and continue through first half, and is said to be for the Army air forces, involving 11,000,000 containers in all. A number of fabricators are said to be participating.

As sellers of cold-rolled sheets are booked up solidly through the remainder of the year, and, in fact, some are no longer able to accept tonnage before late February, it would appear as if special directives will have to be issued, if production on the blitz cans is to begin in December as indicated. Some tonnage may be eked out through further efforts to share the steel, but this is questionable.

Confusion in re-scheduling narrow cold strip orders growing out of cancellations and deferments has not been entirely clarified; until inventories are shaken out this is likely to continue. Some of the hot tonnage for canceled or deferred orders has been rolled and delivered, adding to cold-rollers' inventories volume which can not immediately be processed. Aggregate demand and consumption has not been reduced and new bookings are scheduled for first quarter, although revisions frequently open minor gaps for November and December delivery, which are soon filled. Backlogs with some rerollers cover six months.

Bars . . .

Bar Prices, Page 162

Cold-drawn bar producers report a continued heavy demand for flats, hexagons and squares, particularly hexagons. Some producers, although probably still the exception, are now booked up through first quarter on hexagons. The normal ratio of hexagons to other types of bars has been upset completely, especially because of demands from the aircraft industry, with a result that cold drawers simply do not have adequate facilities for handling this type of tonnage. On ordinary size rounds, even including some of the larger sizes, they can furnish shipments in January and in some cases work in a little tonnage in December. Shell work, cold drawers say, has fallen off noticeably, except perhaps steel for machine gun bullets, principally bessemer steel.

Apart from special allotments, such as for cold drawers, carbon bar producers are booked up solidly through January in most cases. Some are now receiving substantial orders for second quarter delivery. Hot alloy bar demand shows some improvement, but deliveries are less extended than on carbon bars. Some sellers are still in a position to quote for November delivery.

Reshuffling of bar mill schedules, while moving scattered tonnage forward for better delivery, has not materially improved shipments on new orders. Hot and cold-drawn carbon bars and cold-finished alloys generally are in January-February, and on some grades beyond. Hot alloy stock is easier than the average and can still be shipped in November by most producers. In cold-drawn exceptions are ⅝ to 1¼-inch squares, December; cold carbon round, 11/16 to two-inch, March, while some mills are so heavily loaded with small hexagons, they are avoiding orders if possible.

In New England cancellations and deferments have been heavier than estimated, covering a rather wide range of grades and including some jobber tonnage. For Boston 3600 tons of alloy bars have been awarded by lot to Crucible Steel Co. of America for die-lock chain, deliveries to start in fourth quarter, extending into next year. The spread between hot and cold-drawn alloy bars is wider than usual, due to heavy loads on processing equipment; in fact one mill has been taking hot alloy orders for October delivery. Cutbacks have affected fabricators of small armor-piercing shells, reducing requirements of alloys.

Nearby orders have also been canceled by some forging shops and replaced for later delivery, indicating a strong inventory position. On the whole there is no reduction in consumption by forgers. Worthy of note is the release of

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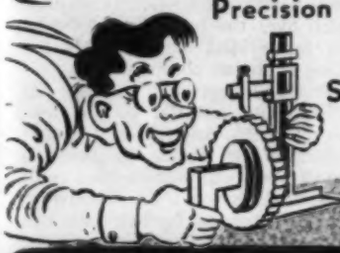

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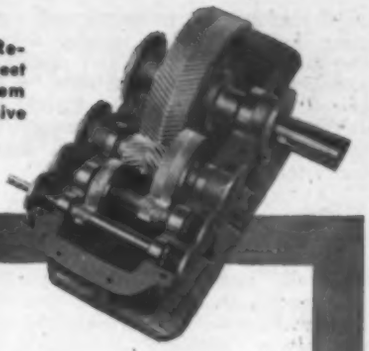

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more cold-finished to textile mill equipment builders for first quarter delivery. Shipyard requirements are maintained and heavy, also bolts and nuts. A New Haven, Conn., shop, cut back some time ago on a prime sub-machine gun contract, has filled the gap with subcontracts for aircraft parts.

Plates . . .

Plate Prices, Page 163

To all practical intents and purposes, plate producers appear to be booked up through February. Jobber and Maritime Commission allotments have not been fully filled in up to the end of February, but assuming that they undoubtedly will be, producers consider themselves scheduled for the period. Orders during August were not as heavy as in July, but considering the extent to which producers were booked (early in August they were virtually sold out for the remainder of the year) this let-up in bookings was not surprising. Meanwhile, jobbers are pressing mills for as much tonnage as possible against early allotments to meet the improved demand which has arisen as a result of the inability of consumers to get nearby shipments from mills.

The heavy tractor program which is scheduled to get under way late this year or early in January and continue for at least eight months, if not longer, is expected to be reflected soon in active buying of plates, bars and other products. One manufacturing interest alone is said to have recently been given a contract for around 8500 of these tractors and other contracts are reported.

Railroad equipment manufacturers have been able to figure on much of this business, particularly those who have had substantial contracts for combat tanks, which over the past several weeks have been terminated or materially reduced. One of these companies has recently received a new tank contract involving 1000 units, but the general tendency has been to concentrate combat tank production as much as possible with some of the large automotive companies, particularly in the midwest, which established huge facilities for this purpose.

Locomotive builders are participating in some of this tractor work, it is said, as a result of a paring down in combat tank programs. This new work, combined with heavy locomotive orders, primarily for the government and for lend-lease, is providing these manufacturers with their heaviest backlogs to date.

In addition to allocations, shipyards are buying direct substantial fill-in plate requirements; a Maine yard is distributing close to 5000 tons of plates, bars, sheets, angles and some strip, deliveries to start in December. With mills sold through fourth quarter on some of these products, warehouses may share heavily in the tonnage. Except for Maritime Commission allotments, most mills are closing January schedules. While shipyard inventories are not as heavy as earlier in the year, they are still large in some cases, especially in semifabricated form. Much tonnage is in storage with a minimum of fabrication done; talk of high inventories among yards in the east persists.

A New England yard building navy ships has had some tonnage canceled with original mills, which has been redistributed; some of this tonnage went to mills not usually supplying the yard. A Rhode Island shipbuilder has nearly 25 ships, mainly frigates, prefabricated and has been hampered by labor trouble growing out of union differences with the state manpower director, which in effect boycotted the yard. The unions forced the replacement of the director. A significant development is that some shipbuilders are considering cancellation clauses in steel and other material contracts. Two fabricating shops in New England have placed substantial tonnages of floor plates, 3/16-inch sheared plates and heavy sheets for pontoons. Heavy demand for flame-cut shapes holds and structural shops continue to take more plates than shapes.

Rails, Cars . . .

Track Material Prices, Page 163

The recent flurry in car demand continues, latest lists including 1600 cars pending for Central Railroad of New Jersey and 400 for the Seaboard Air Line. The Central list comprises 1000 gondolas, 500 hoppers and 100 flats. The Chicago & North Western has been authorized by the federal court to purchase 525 freight cars and 20 diesel locomotives.

While full returns are not available, domestic freight car buying in August is believed to have been the heaviest since January.

Missouri Pacific has been authorized by the United States district court at St. Louis to buy six new lightweight passenger coaches and a new diesel loco-

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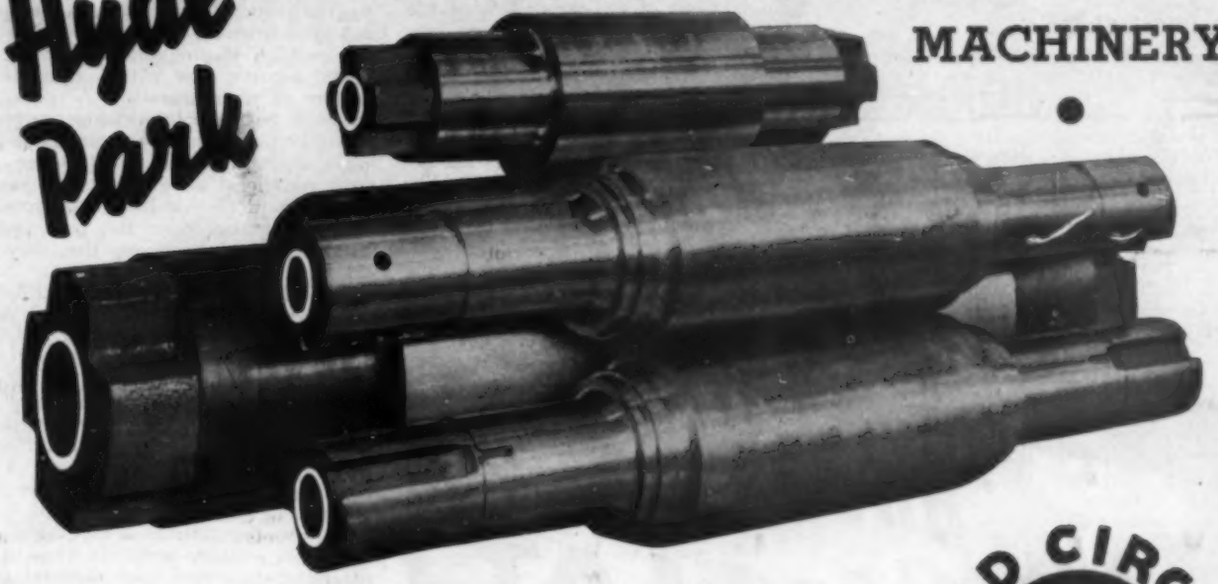

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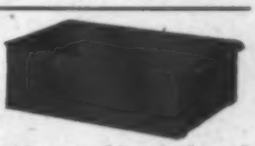

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motive, at cost of about $823,000, subject to approval of War Production Board.

Structural Shapes . . .

Structural Shape Prices, Page 163

Bookings of fabricated structural steel, including buildings, bridges and various war products items, during July totaled 63,220 net tons, according to the American Institute of Steel Construction. This compared with 100,427 tons in June and 125,243 tons in July, 1942. Shipments declined to 60,962 tons from 81,843 in June. Shipments in July, 1942 were 189,937 tons. Tonnage available for fabrication within the next four months was 286,279 tons.

Pig Iron . . .

Pig Iron Prices, Page 164

An increase of $6 per ton, from $28 to $34, on Lake Superior charcoal pig iron, retroactive to July 1, has been granted to Office of Price Administration. This followed a petition by producers, who stated they were producing at a loss and a study of their financial position convinced OPA they could not continue to absorb the losses. The higher price is authorized in amendment No. 7 to Revised Price Schedule No. 10.

New forms are being issued to pig iron consumers, WPB-3172, for compilation of requests for iron, succeeding WPB-900, which was brought out a couple of months or so ago and which in turn succeeded the PD-69 form. The latest blank is said to be quite similar to its predecessor, although providing for some rearrangement of priority data to enable Washington, according to trade reports, "to get a little better picture of requirements." A special effort will be made by Washington to get this new blank out to consumers in time for use in applying for October tonnage. At least some dealers are returning applications that have been received from consumers over the past two or three days, with requests that they obtain the new forms.

In addition to the new WPB-3172 form, Washington has also issued WPB-3173 form covering inventory and consumption statistics. This form will succeed WPB-901, which in turn, succeeded PD-70.

New York district consumers will receive less tonnage in September than in August, although allocations, it is pointed out, were much in line with original requests. The trend, it is asserted, simply reflects a continued falling off in foundry melt. In view of the decline in machine tool demand some builders are already arranging to shift to other types of war work and this is having an effect, temporarily at least, on their castings requirements and, in turn, upon specifications for pig iron.

The newly announced increase of $6 on charcoal pig iron, to $34, f.o.b. furnace, will lift the price in the New York Metropolitan area to more than $43 a ton. This increase, however, still leaves the market much lower than upon occasion during the first World War, when, according to some sellers, prices as high as $100, f.o.b. furnace, were paid.

Revisions in sources of supply for September rather than material change in overall requirements marks pig iron allocations in New England. The Everett furnace has a much heavier basic schedule; two-fifths of the 10,000 tons needed by the largest district steel works consumer are from Metals Reserve Co. production, Mystic Iron Co. acting as agent. In the past this tonnage has gone to Buffalo district furnaces, frequently supplied by an integrated steel works unit. On the other hand, about one-third of the basic required for a Rhode Island steelworks went to Buffalo for September. These, and other changes in supply sources, follow considerable shuffling in applications for iron, some due in part to efforts to avoid the $2 premium on Everett iron. This jockeying applies mainly to gray iron foundry grades, more affected by the decline in demand than basic and malleable. In scattered instances gray iron foundries have secured some additional castings orders, but not enough to influence the general slackness; most are confronted with manpower shortages despite, and probably because of, curtailed melt.

Metallurgical Coke . . .

Coke Prices, Page 163

Production in the Connellsville coke region continues at about 80 per cent of capacity, lack of manpower and poor coal holding down any increase. Demand is heavy, although stocks have been rebuilt to prepare against a possible coal strike after the Oct. 31 deadline.

Production of by-product and beehive coke in the United States in July was 5,886,551 net tons, compared with 5,-

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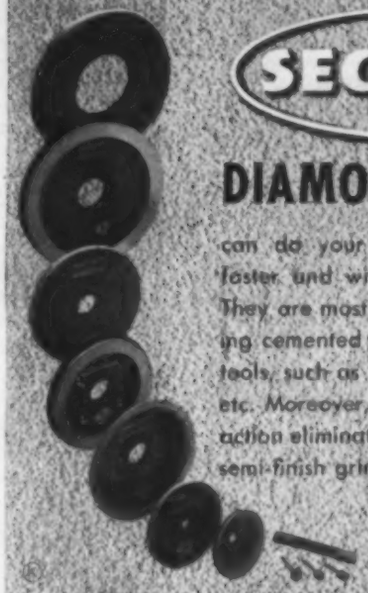

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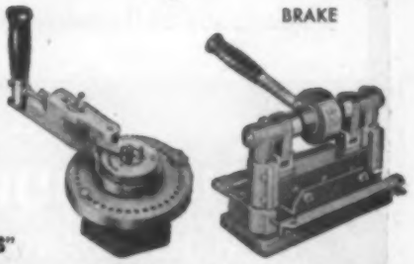

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483,694 tons in June and with 5,975,600 tons in July, 1942. The increase of 402,857 tons over June output consisted of 205,963 tons of by-product coke and 196,894 tons of beehive, according to the Bureau of Mines.

Stocks of by-product coke held by producers Aug. 1 totaled 866,253 tons, 23,722 tons more than July 1, and represented 5.1 days production at the July rate. Stocks of coking coal at by-product plants declined 323,841 tons during July and as of Aug. 1 amounted to 6,818,746 tons, sufficient for 28 days' requirements at the July rate of consumption by these ovens.

Scrap . . .

Scrap Prices, Page 166

Demand for steelmaking scrap in the Pittsburgh district continues heavy, with inadequate supplies. Large consumers are taking all available material. Blast furnace grades are the worst bottleneck, with turnings next. New crushing facilities are idle for lack of suitable turnings. Only one major buyer in the district is out of the market, all others building up stocks or increasing the flow to meet demand for expanded melting facilities. Increased tightness is expected to develop shortly in low phos grades.

Dealer scrap volume is light in New England, with prospects for a continued lean supply from usual sources. Plant scrap production is also off, but is in relatively better supply than yard material. With district melters of low phos in a comfortable position, substantial part of shipyard scrap is going to outside consumers, notably in Pennsylvania; scrap continues to come from shipyards in good volume. Cast grades have slackened after a brief flurry, supported largely by outside foundries and steel works buying charging box heavy cast, which is scarce. The street car rail recovery program has slackened. Thousands of tons of rails still are embedded in streets, but the cost of recovery and street repairs has frequently exceeded $100 a ton; the $40 per ton subsidy holds no attraction for most municipalities. The decline in scrap melt by cast pipe foundries in the East is drastic.

Steelmaking scrap continues scarce in the St. Louis area and the drive now in progress is disappointing in quantity and quality. Current yard receipts are insignificant and labor shortage delays processing and shipment to consumers.

Semifinished Steel . . .

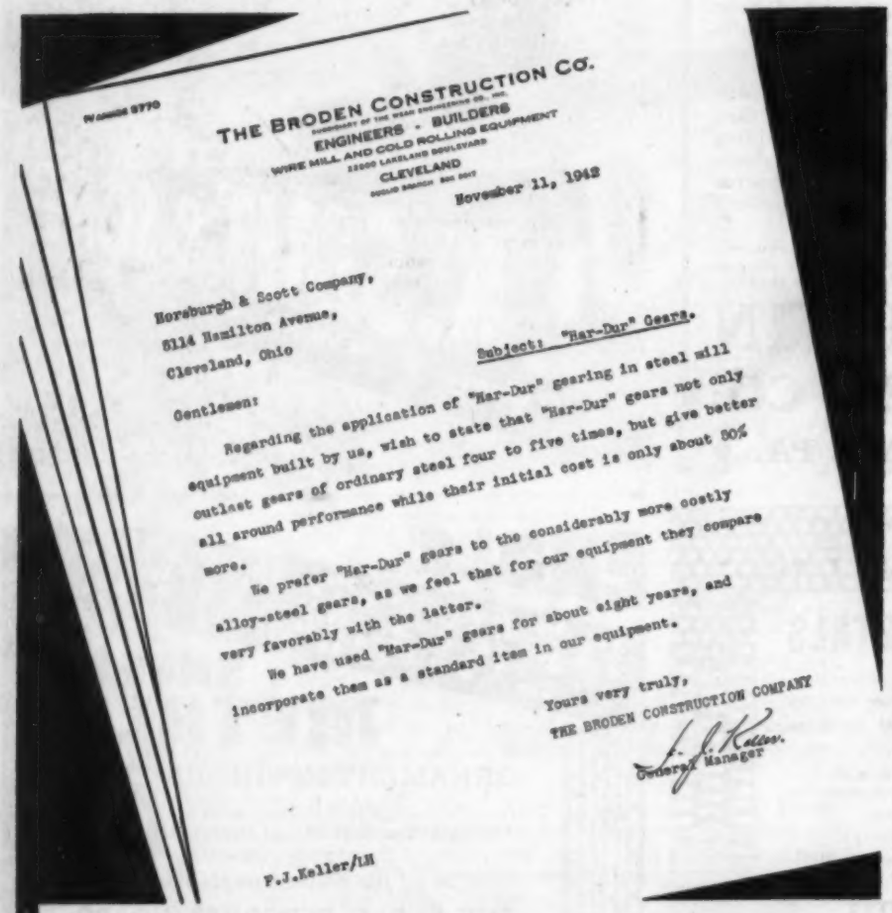
Semifinished Prices, Page 162

Generally speaking the situation in semifinished steel is still tight, with insufficient quantity to go around. Ingot allocations continue to be used to fill the breach as far as possible. In a few minor cases producers are out looking for business in the domestic market to replace tonnage formerly taken by export factors, principally lend-lease. A small volume of alloy ingot is available on this basis. The share the steel program has eased the picture somewhat, although the total volume is small in comparison with the overwhelming demand.

Canada . . .

Toronto, Ont. — While sales volume is showing improvement over the preceding three or four weeks production of iron and steel in Canada is moving forward comparately slowly and only a couple of specialties are reported in short supply for war industry. Production capacity for both steel and iron added this year is not being taken full advantage of chiefly due to difficulty in obtaining sufficient labor, and actual production figures are still running below those of the peak levels of 1942. With the increased blast furnace capacity of which 93.9 per cent is in operation, actual pig iron production is only 70.8 per cent of the rated total, while output of steel ingots and castings is 85.11 per cent. Despite slowing in production during the first seven months of the year, there has been actual betterment in the ratio of supply and demand for both steel and iron as far as war consumers are concerned, while at the same time lower tonnages now are being made available to the more essential non-war users. Further slowing down in Canada's war production program was announced during the week, chiefly affecting shell and gun output. Reports from British Columbia also indicate that shipbuilding in that area is dropping off, but so far there has been no announcement of curtailment on this account in eastern Canada yards.

While comparatively little action is reported in structural shapes, except for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demand on shipbuilding account, occasional orders appear. Lettings for the week were at approximately 2500 tons, and included a single order to Dominion Bridge Co., Lachine, Que., for 1200 tons for a bridge at St. Felicien. Other awards were in small lots, chiefly for small war plant additions.

Steel in Europe . . .

London—(*By Radio*)—Steel supply in Great Britain is adequate for war needs and steady flow is being maintained of semifinished steel to rerolling mills. Heavy pressure is being exerted on producers for deliveries of plates and sheets. Engineering foundries are active.

Nonferrous Metals . . .

Nonferrous Prices, Page 168

On Report Forms 120:7b made each month by consumers of copper scrap and copper alloy scrap, it is essential that each grade purchased be identified by the grade name used in MPR 20. In many cases, consumers have continued to use meaningless terms to designate the material purchased. Obviously, reports of this nature cannot be checked. Much needless correspondence and trouble may be avoided by using proper terms as required by the Regulation.

In this connection, it should also be pointed out that the Regulation specifies that the factors for which a reduction is required be stated, that the form in which the material was received be stated if a special preparation premium has been paid, and that all controlling analyses and the computation of the price in full be stated if the price of any item is determined on the basis of analysis.

Nonferrous Scrap Ample Buying Controlled Materials

While supply of copper scrap in the Pittsburgh district is not large it apparently is adequate for immediate needs. Shipments of automobile radiators have picked up after a drop occasioned by reduction in pressure on automobile wreckers. Miscellaneous heavy copper scrap and wire from industrial sources continue at about the same level. Yellow brass scrap is sufficient for all needs and there is more than an ample supply of all the white metals. Dealers report a substantial volume of aluminum scrap in yards, with more being offered at nominal prices.

Certain Steel Producers May Buy Premium Grade Spar

John T. Whiting, director, Steel Division, War Production Board, has certified permission for all producers of electric furnace steel to purchase premium grade fluorspar as covered in section 3, revised maximum price regulation No. 126, dated July 1, 1943, as issued by the Office of Price Administration. Any other steel producer who requires premium grade fluorspar must present the complete detailed technical data to the director of the Steel Division for consideration.

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680 tons, addition, Edward Hines Jr. hospital, Chicago, for U. S. Veterans Administration; government will supply rail and Calumet Steel Co., Chicago, will roll and fabricate; Paschen Contractors Inc., Chicago, contractor; bids Aug. 20.

RAILS CARS . . .

FREIGHT CAR AWARDS

Chicago & North Western, 500 seventy-ton ore cars, to Bethlehem Steel Co., Bethlehem, Pa., and 25 flat cars to Pullman-Standard Car Mfg. Co., Chicago; purchases authorized by federal court.

FREIGHT CARS PENDING

Central Railroad of New Jersey, 1000 gondolas, 500 hoppers and 100 flats; bids opened last week; also a number of underframes.

Seaboard Air Line, 200 gondolas and 200 box cars; bids Sept. 20.

LOCOMOTIVES PLACED

Chicago & North Western, 20 diesel locomotives, to American Locomotive Co., New York, purchase authorized by federal court.

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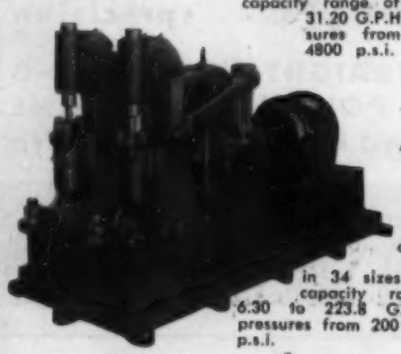

"H" TYPE PUMP
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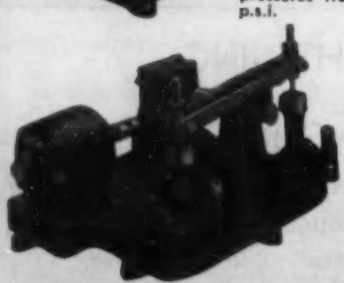

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Automobile Builders Inquiring For Postwar Machine Tool Needs

Cleveland — To obtain an early position on machine tool builders' production schedules in the postwar period, and to get as much as possible of the preliminary engineering work out of the way on projected new tool designs, a number of automotive concerns are placing inquiries with tool builders for delivery soon after the end of the war. Much of the engineering work can be fitted in during the intervening months and should be of considerable aid in speeding the postwar reconversion.

Because of the uncertain cost element and fear of inflation in the postwar period, machine tool companies are making no definite commitments as to prices or time of delivery on these inquiries. A number of tool builders expect that OPA price ceilings will remain in effect in the immediate period following the war.

Machine tools produced since 1940 for war industries are beginning to come back on the market as the result of contract cancellations and over-buying by government procurement agencies.

With order backlogs dwindling and new orders at the lowest level since the start of the war program—estimated at 29.5 per cent of production during July—some machine tool plants are eliminating Sunday work. By and large, however, working hours of machine tool builders continue high for most tools still on order are wanted quickly.

Although Warner & Swasey Co., Cleveland, is acting as a subcontractor for 20 companies engaged in manufacture of war materiel, and is in production of a wide variety of equipment, they have recently been forced to let out 450 men. The company is in the process of designing jigs and fixtures for additional subcontract work and are hopeful of being able to rehire a greater portion of these men.

Another company has recently been forced to let out 500 men; while the night shift of still another concern has been let go, numbering close to 300 men. However, in general the industry has been able to keep its working force intact, although not for as long a work week as previously.

With machine tool order backlogs down to about an average of four months, machine tool builders are securing contracts providing for new application of plant facilities and personnel. The industry has made considerable progress in this direction, although during the transition period the over-all output has been substantially retarded.

Typical of what is going on in the industry the Cleveland Automatic Machine Co. is carrying out extensive factory changes in preparation for the manufacture of lift trucks under special license with the Clark Equipment Co., Buchanan, Mich., for the Army and Navy. The company recently purchased the G. & M. Mfg. Co. to build die-casting machines. C. V. Patrick, executive vice president, states the new line will assure a high level of employment. Coincident with the announcement of the new products, the first time in the 50-year history of the company that anything but automatic machines has been made, appointment of Clyde Austin as general factory superintendent was announced.

In the advancement of Robert R. Rhodehamel to general sales manager, the National Acme Co., Cleveland, takes another step in its program of converting excess manufacturing facilities to the needs of industries entering postwar production. The company has developed specialized divisions for threading tools, airplane wheels and brakes, and electrical specialties, in addition to its line of multiple spindle bar and chucking automatics. Mr. Rhodehamel will concentrate on engineering-sales for a wide variety of contract manufacturing work.

WPB reports July machine tool shipments totaled $97,428,000, a decrease of 10.4 per cent from the $108,689,000 record in the preceding month, and a further decline is indicated for August. New orders declined to $28,795,000 from the June total of $38,322,000. Cancellations during the latest period amounted to $12,734,000.

Unfilled orders as of July 31 totaled $441,311,000, against $511,478,000 at the close of the preceding month and $1,374,735,000 on the comparable date last year.

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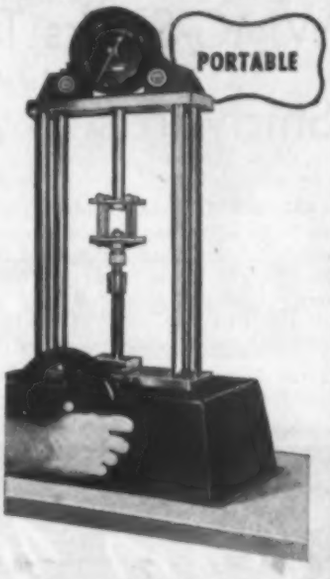

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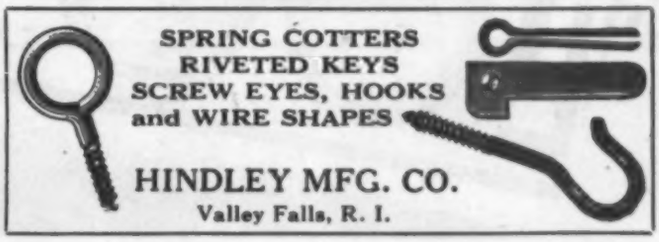

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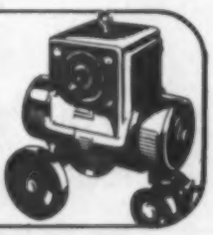

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WMC Seeks To Shift Workers from Shipyards to Aircraft Plants

Seattle—Manpower problems in Western Washington are receiving primary attention at the hands of federal officials, the objective being to recruit 9000 additional workers for the Boeing Aircraft Co. so that the production of flying fortresses may be maintained at required schedules. The Boeing campaign is meeting success but the necessary number of additional workers has not been signed.

From A. F. Hardy, state director of the War Manpower Commission, came an order to Washington state shipyards to reduce overall payroll by 10 per cent by Sept. 15. Shipyards are reported to have hoarded manpower, Hardy's estimate of unneeded workers in state shipyards being 16,000. The industry in Washington state employed 143,000 workers as of July 1. WMC officials figure that the ship production program can be filled with 10 per cent less working personnel, the overage to be absorbed in other essential industries, including aircraft, metals, logging, mining and food processing.

To some extent the Army has eased its recent strict orders not to place new business with plants in King, Pierce and Kitsap counties, which include Seattle, Tacoma and the Puget Sound navy yard area, on the grounds of a critical manpower situation. The latest directive permits awarding contracts to factories in this area providing such new work does not require hiring of additional labor.

Washington state department of labor expects the state's industrial payroll in 1943 to show a gain of 113 per cent over 1941, although workmen's hours will increase only 54 per cent. The estimates are based on figures of the first five months of this year. The average hourly wage will increase 38 per cent over 1941 and is 19 per cent above the Little Steel formula. Increases for 1943 over 1941 include shipbuilding: payroll, 1467 per cent; workmen's hours, 1226 per cent; average hourly wage, 17 per cent; aircraft plants: 183, 133 and 22 per cent, respectively. The one exception to the upward trend is lumber, where decreases are noted compared with 1941.

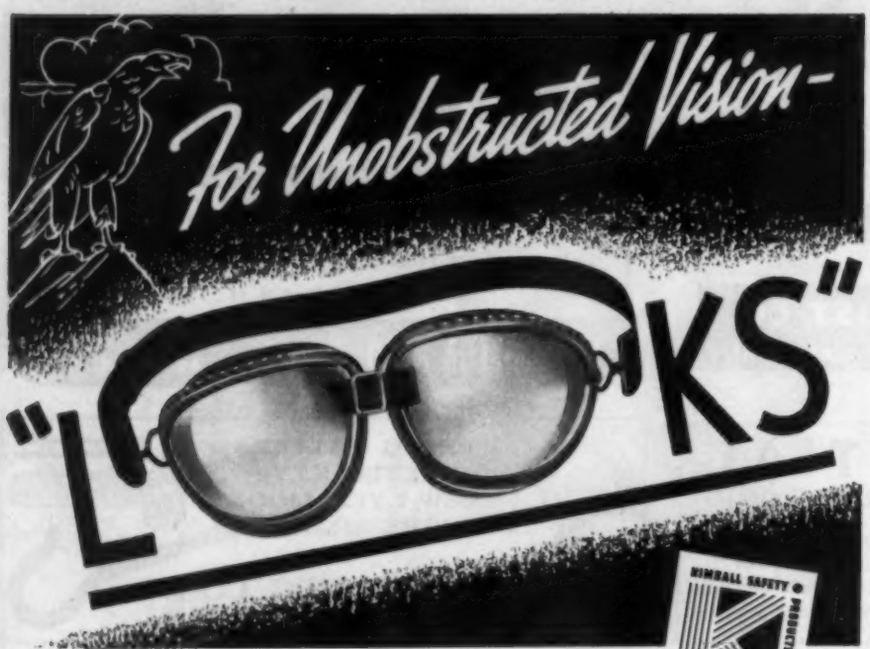
Word comes from Washington State College, Pullman, that Dean A. E. Drucker, of the College of Mines, and associates have developed a new process for extracting manganese from ores found in the Olympic Peninsula. It is described as a sulphuric acid dioxide leach followed by electrolysis.

Bonneville Administration reports that the system for the first time passed the 1,000,000-kw work power mark, the new record of 1,038,000 being reached one day in August and other days since have exceeded 1,000,000.

U. S. engineers, Portland, Oreg., are making postwar plans for power development, irrigation, navigation and flood control in the Columbia Basin. The study will cover a period of five years and is expected to be of major importance soon after the end of the war.

Tacoma reports its second Nisqually $18,000,000 power project half completed. It involves relocation of 14 miles of main Milwaukee railroad track and creation of a 10-mile lake which will wipe out the town of Alder. The increased plant will produce a peak load of 114,000 kw, the present capacity being 24,000 kw. Meanwhile demand for power is so urgent that the Tacoma system has been purchasing half of its needs from Seattle and Bonneville.

Navy department has approved the following projects in this area: Conversion of tanks at fuel depot Orchard Point, $150,000; torpedo repair shop and additional repair shop in Puget Sound district, $46,350; disposal plant, Seattle naval base, $125,000.



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CLEVELAND—Fouts Machine Co. has been incorporated to manufacture tools, castings, machinery and equipment by L. B. Parks, Margaret Galen and William P. Fouts. The latter, Worrell road, RFD No. 2, Willoughby, O., is agent.

CLEVELAND—Industrial Rayon Corp., West Ninety-eighth street and Walford avenue, will double capacity of its continuous process plant at Painesville, O., by addition of capacity for production of 22,000,000 pounds of high-tenacity tire yarn. WPB priorities for equipment have been granted.

CLEVELAND—Johnston & Jennings Co., 877 Addison road, has let contract for a detinning plant in Alabama to H. K. Ferguson Co., Hanna building, Cleveland, at cost estimated at $2,000,000.

MAINE

LEWISTON, ME.—City is having plans prepared for postwar construction of an incinerator plant to cost about $557,000.

PORTLAND, ME.—J. E. Barlow, city manager, 389 Congress street, plans rubbish and garbage incinerator costing $100,000 and sewerage expansion for postwar construction.

CONNECTICUT

WEST HAVEN, CONN.—Armstrong Rubber Co., 475 Elm street, is taking bids on a one-story plant addition 100 x 160 feet to cost over $40,000. Fletcher, Thompson Inc., 211 State street, Bridgeport, Conn., is engineer.

NEW YORK

DUNKIRK, N. Y.—A. G. Walter, city engineer, is in charge of plans for postwar construction of an incinerator plant costing about $60,000.

NEW JERSEY

ELIZABETH, N. J.—Central Railroad of New Jersey, A. E. Owen, chief engineer, Reading Terminal, Philadelphia, is taking bids on a two-story locomotive repair shop to cost about $45,000.

HARRISON, N. J.—Public Service Gas & Electric Co., 80 Park place, Newark, N. J., has let contract for a two-story 62 x 96-foot generator house addition to United Engineers & Constructors Inc., 140 Arch street, Philadelphia, estimated to cost about $140,000.

PENNSYLVANIA

ALTOONA, PA.—C. E. Rhodes, mayor, plans two additional sewage disposal plants and sewer extensions for postwar construction, at cost of about $425,000. B. Schwab, city hall, is city engineer.

MICHIGAN

CALUMET, MICH.—Calumet & Hecla Consolidated Copper Co. has started reconstruction of the Calumet mill at Lake Linden. Will contain nine units. Concentration machinery will be remodeled and flotation machines will be installed.

ILLINOIS

CHICAGO—Department of public works, O. E. Hewitt, commissioner, city hall, will open bids Sept. 14 for pumps and piping, including traveling crane, for South District filtration plant at East Seventy-ninth street and Lake Michigan.

WAUKEGAN, ILL.—American Steel & Wire Co., 208 South La Salle street, Chicago, will award contracts soon for a rod storage and patenting building.

KENTUCKY

FRANKFORT, KY.—Schenley Distilleries Corp., Carl J. Kiefer, vice president, has let contract to Frank Messer & Sons Inc., 2515 Burnett street, Cincinnati, for protein recovery plant in connection with George T. Stagg Co. Inc. WPB has approved priorities and expenditure up to $550,000. Includes two-story dry-house, alterations additions to boiler plant, installation of generating and other equipment.

LOUISIANA

GRETNA, LA.—Gulf Distilling Corp. will let contract soon for a yeast house. W. B. Moses and L. S. Weil, 427 South Peters street, New Orleans, are engineers.

WISCONSIN

OSHKOSH, WIS.—Oshkosh Wood Products Corp., J. H. Riegel, president, manufacturer of venetian blind slats, will rebuild burned plant.

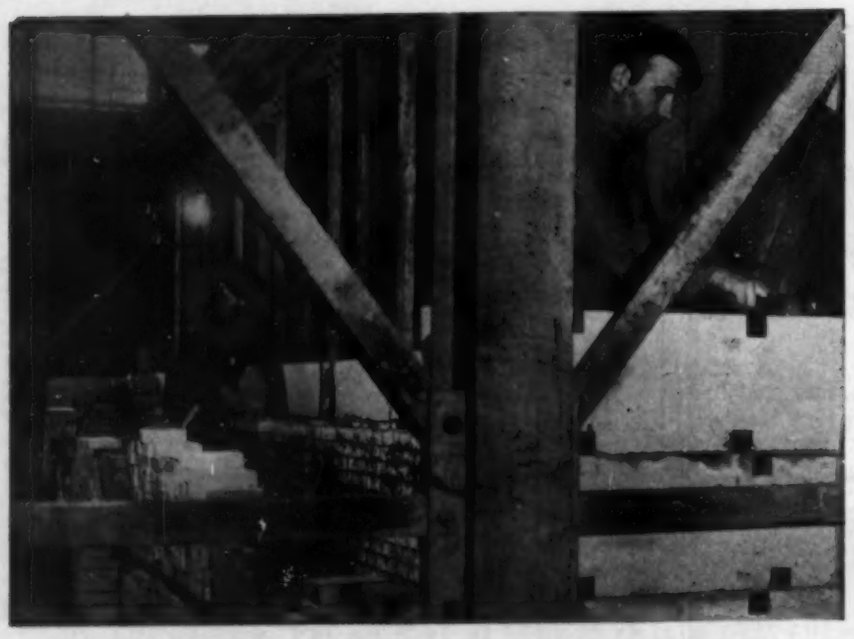
OSHKOSH, WIS.—U. S. Motors Corp., manufacturer of marine engines, has let contract to C. R. Meyer & Sons Co. for a one-story factory addition 25 x 80 feet.

PORT WASHINGTON, WIS.—Harnischfeger Corp., Milwaukee, has leased buildings of Port Washington Dock Co., Lake street, and will remodel at cost of about $75,000 for manufacture of diesel engines.

MINNESOTA

MINNEAPOLIS—Great Northern Railway Co., F. C. Spencer, yard superintendent, plans rebuilding of several shop buildings in the repair yard at Twenty-fifth avenue and Elm street S.E., recently burned with loss of about $140,000.

ST. CLOUD, MINN.—Char-Gale Mfg. Co., airplane division, Charles L. Johnson, president,



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plans expansion of plant and installation of fixtures and tools for production of fuselages for cargo transports.

TEXAS

HOUSTON, TEX.—Oil Tool Mfg. Co., 1318 Mance street, has had plans prepared by S. Dixon, 6902 Main street, for a structural steel and masonry plant costing about $75,000.

HOUSTON, TEX.—McEvoy Co., 600 Milby street, has let contract for a shop building to P. M. Marshall, 2216 Congress street, to cost about $53,000.

SAN ANTONIO, TEX.—City public service board has let contract for engineering and supervision to Gibbs & Hill, Pennsylvania Station, New York, for construction of city's new electric power unit, work to start at once. Estimate of cost is $2,000,000. Boiler will be installed in December, generator in July, unit to be in service in about a year.

WESLACO, TEX.—Rio Grande Valley Citrus Exchange, R. B. McLeasish, manager, has let contract to Noser Construction Co., State Bank building, McAllen, Tex., for $60,000 warehouse building 120 x 280 feet.

NEVADA

APARKS, NEV.—Southern Pacific Co., W. H. Kirkbridge, chief engineer, 65 Market street, San Francisco, will let contract soon for a locomotive erecting shop.

UTAH

MARYSVALE, UTAH—Contract has been awarded to H. K. Ferguson Co., Cleveland, for construction of an alunite treating plant for Aluminum Inc. Engineers are inspecting site of proposed plant.

WYOMING

SHERIDAN, WYO.—Consolidated Mining Co. of South Dakota, Custer and Keystone, S. Dak., will build a feldspar plant at the Story mine, near Sheridan. Priorities have been granted for part of the material for a 240-ton mill.

CALIFORNIA

BURBANK, CALIF.—Menasco Mfg. Co., 805 South San Fernando road, is building a warehouse structure at its engine manufacturing plant, 57 x 422 feet, to cost about $30,000.

CLEARWATER, CALIF.—A. J. Carlton Forge Works, 1225 West Adams street, will build a small addition to its welding shop, 16 x 24 feet.

LOS ANGELES—Airesearch Mfg. Co., 9851 Sepulveda boulevard, will build an addition to its plant 35 x 40 feet, to cost $3500.

LOS ANGELES—Superior Tank & Construction Co., is building a plant addition 41 x 125 feet, to cost about $6000, at 6155 South Eastern avenue.

LOS ANGELES—Aircraft Stamping Co., 1754 Main street, has been formed by Jack P. Strutzel and Anthony M. Cioffi.

LOS ANGELES—Pacific Engine Precision Co., 706 West Jefferson boulevard, has been formed by Verne M. Mantle and George Goldwater.

LOS ANGELES—Pietro & Gill Machine Products, 410 East Third street, has been formed by P. N. Pietro and Edward R. Gill and will establish a manufacturing business at that address.

NORTH HOLLYWOOD, CALIF.—A. K. Tool Co., 4850 Vineland boulevard, has been formed by E. A. Kaufman and R. L. Alsdurf.

SAN DIEGO, CALIF.—Austin Co. will build a factory addition 72 x 150 feet at plant of Consolidated Vultee Aircraft Corp., Pacific Avenue, at cost of $53,000.

SAN PEDRO, CALIF.—Texas Co. has let contract to Bechtel-McCone-Parsons Corp., 601 West Fifth street, Los Angeles, for three pressure storage tanks 12 x 78 feet each at its new plant, 2100 East Pacific Highway, Wilmington, Calif., at cost of $11,000 each.

SAN PEDRO, CALIF.—Texas Co. is building a new refinery plant at 2100 East Pacific Coast highway, Wilmington, Calif. Construction is by Bechtel-McCone-Parsons Corp., 601 West Fifth street, Los Angeles. Cost is estimated at over $282,000.

SAN PEDRO, CALIF.—Western Pipe & Steel Co. has let contract to Noel M. Calhoun, 845 North Highland avenue, Los Angeles, for an addition to its shop building at 1660 Wilmington-San Pedro road, to cost about $50,000.

SANTA MONICA, CALIF.—Douglas Aircraft Co. Inc. is building an addition to its punch press and template building at 3000 Ocean Park boulevard, at cost of about $40,000.

WASHINGTON

PASCO, WASH.—Washington Culvert & Pipe Co., subsidiary of Armco, plans a plant on a 70-acre tract leased from Northern Pacific railroad, to specialize in large sizes of sewer pipe, culverts and other pipe, especially for military projects.

SEATTLE—Austin Co. has been given contract for a reduction plant at 4501 Shilshole avenue for Lyle E. Branchflower Co. Main building will be 85 x 100 feet, with three smaller structures, wharf and tank farm. Plant will produce vitamin oils, fish and vegetable oils and animal fats. Plant will include complete refinery.

SEATTLE—Western Gear Co., engaged in war contracts, has leased a building at 913 Jackson street, adjacent to its main plant, and will install additional equipment.

SEATTLE—Standard Mfg. Co. suffered plant loss of about $9000 by fire, including damage to equipment and parts being fabricated for Boeing Aircraft Co.

SEATTLE—City has $121,000 available for purchase of circuit breakers and other accessories for local steam plant of city light department. Also has $29,000 for purchase of motor generator for Skagit project railroad, hauling material for Ross dam construction.

SEATTLE—United States engineer is considering bids for a major lend-lease assembly depot, covering 500 acres, at Auburn, Wash., involving large structures and extensive railroad trackage.

YAKIMA, WASH.—Bureau of Reclamation will open bids at Yakima Sept. 15 for a unit of the Roza division of the Yakima project, involving 14,000 feet of concrete pipe and placing of 5000 pounds of reinforcing steel, and other items.

CANADA

ETOBICOKE, ONT.—Aluminum Co. of Canada Ltd., 1700 Sun Life building, Montreal, has given general contract to A. W. Robertson Ltd. for construction of plant addition here to cost about $25,000.

JOLIETTE, QUE.—Ed. Gohier Ltee., 25 St. Thomas street, is having plans prepared for rebuilding sawmill here to cost, with equipment, about $15,000.

LONDON, ONT.—Spraymotor Ltd., 1103 York street, is having revised plans prepared by L. G. Bridgmen, architect, Bank of Toronto building, in connection with proposed plant addition to cost about $25,000. Tenders to be called in few days.

LAC EDOUARD, QUE.—Canadian National Railways, Barton Wheelwright, chief engineer, Union Station, Toronto, has given general contract to L. G. Ogilvie & Co. Ltd., 2228 Walkley avenue, Montreal, for construction of engine house here to cost $150,000.

MONTREAL, QUE.—Standard Machine Shop Ltd., 2165 Demontigny street East, will start work immediately on plant addition, to cost, with equipment, about $22,000.

MONTREAL, QUE.—Canadian Pratt & Whitney Co. Ltd., in association with the Department of Munitions and Supply, Ottawa, R. T. Donald, secretary, has called tenders for construction of addition to propeller overhaul shop, to cost about $50,000.

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BORING MILL, 42" Bullard, 2 heads, M.D.
DRILL, Radial 3-1/2' Cincinnati-Bickford, M.D.
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HAMMER, Steam Forging 1100 lb. N-B-P.
SHEARS, Plate 44" & 54" x 3/16" M.D.
SHEAR, angles No. 4 Cleve. 6"x6"x1", M.D.
STRAIGHTENER, Wire Shuster, cap. 5/8".
STRAIGHTENER, Tube Torrington 1/4"-5/8" O.D.
STRAIGHTENER, Plate 12-roll H&J, 84" x 1/4".
TURRET LATHE, 34" Gisholt, H.S.-1/4", M.D.
TURRET LATHE, 26" Libby, H.S. 7-1/2", S.P.D.

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References: Continental Illinois National Bank & Trust Company, Chicago; Lake Shore Trust & Savings Bank, 605 N. Michigan Avenue, Chicago; Pullman Trust & Savings Bank, 400 E. 111th Street, Chicago; Dun & Bradstreet, Chicago; Steel, Oil, Mining, Engineering, Fabricating, Railroad, Defense Plant Corporations, U. S. A., Et Cetera.

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Boring Mills: 36", 42", 54", 60", 10'
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Turret Lathe: 24" Gisholt, 6¼" hole
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1—DETREX DEGREASER

Model 2D-600-GT, size 6107-G with Partlow Vapor Level Control (safety control to prevent overheating). Cost new $686.00. Used very little.

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BORING MILL, 72" Niles, B.D.
GRINDER, Roll 30"x76" Farrel, M.D.
KEYSEATERS, No. 2 M. & M. & No. 2 Baker.
LATHE, 26"x14' Bridgeford, Grd. Bd.
SHAPER, 36" Morton Draw Cut.
SHEAR, Rotary 3/4" Newbold, 50" gap.
SHEAR, 44"x3/16" American, B.D.
SHEARS, Alligator, 1"-4".
SLOTTER, 12" Putnam, 33" table, B.D.
STRAIGHTENER, 48"—17 rolls—4" dia.

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1208 House Bldg. Pittsburgh 22, Pa.

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Please address replies to Box 996, STEEL, Penton Bldg., Cleveland 13, Ohio.

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TRUCTURAL STEEL ESTIMATOR and DESIGNER
Large fabricating shop located in Pittsburgh area needs experienced Structural Steel Estimator and Designer who understands structural steel shop costs. Give references and salary expected with application.
Reply Box 984
STEEL, Penton Bldg., Cleveland 13.

Help Wanted

WANTED
MECHANICAL ENGINEER
Experienced in sheet metal fabrication. A working knowledge of dies as well as experience in the design and construction of jigs and fixtures essential. Must be capable of assuming full responsibility of manufacturing methods in cooperation with operating organization. In reply state age, background, experience, and all essential facts required for prompt action.
Reply Box 992
STEEL, Penton Bldg., Cleveland 13

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ACCOUNTANT, AGE 43. 18 YEARS EXPErience as chief accountant and office manager of well known manufacturing concern. Thoroughly familiar with all phases of manufacturing and cost accounting. Seeks position with postwar future with large concern, preferably in Southeast. Best references. Reply Box 979, STEEL, Penton Bldg., Cleveland 13.

SALESMAN — TWENTY-FIVE YEARS SUCcessful representation of Steel Mills and Foundries contacting Fabricators, Manufacturers, Warehouses etc. in St. Louis and Southwest. Also familiar with Machinery and Tools. Desires sales position in above territory. Best of references can be furnished. Reply Box 993, STEEL, Penton Bldg., Cleveland 13.

SALES REPRESENTATIVE—MAN 45 YEARS of age with mill and shop experience, 10 years of mechanical drafting and 10 years of selling steel products to dealers and jobbers. Desires position with some company who has or desires representation in the East. Reply Box 999, STEEL, Penton Bldg., Cleveland 13.

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Ad No. 822—
ADDITIONAL ACCOUNT FOR REPRESENTAtion in Chicago area wanted by well financed, energetic, Gentile sales organization, established 25 years in Chicago. Steel or kindred lines preferred, now or post-war. Confidential. Correspondence invited. Reply Box 997, STEEL, Penton Bldg., Cleveland 13.

SALES ENGINEER WITH 12 YEARS EXPERIence in Northwest as steel and steel products mills representative, will consider one additional mill representation. Reply Box 991, STEEL, Penton Bldg., Cleveland 13.

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KING FOUNDRIES, INC., NORTH WALES, Pa. Grey Iron and Semi Steel Castings, also alloyed with Nickel, Chrome, and Molybdenum. Wood, Iron, Brass, and Aluminum Pattern work.

7 things you should do to keep prices down!

If prices soar, this war will last longer, and we could all go broke when it's over. Uncle Sam is fighting hard to keep prices *down*. But he can't do it alone. It's up to *you* to battle against any and every rising price! To help win the war and keep it from being a hollow victory afterward—you must *keep prices down*. And here's how you can do it:

1. BUY ONLY WHAT YOU NEED

Don't buy a *thing* unless you *cannot* get along without it. Spending can't create more goods. It makes them scarce and prices go up. So make everything you own last longer. "Use it up, wear it out, make it do, or do without."

2. PAY NO MORE THAN CEILING PRICES

If you do pay more, you're party to a black market that boosts prices. And if prices go up through the ceiling, your money will be worth less. Buy rationed goods only with stamps.

3. SUPPORT HIGHER TAXES

It's easier and cheaper to pay for the war as you go. And it's better to pay big taxes *now*—while you have the extra money to do it. Every dollar put into taxes means a dollar less to bid for scarce goods and boost prices.

4. PAY OFF OLD DEBTS

Paid-off debts make you independent now . . . and make your position a whale of a lot safer against the day you may be earning less. So pay off every cent you owe—and avoid making new debts as you'd avoid heiling Hitler!

5. DON'T ASK MORE MONEY

in wages, or in prices for goods you have to sell. That puts prices up for the things all of us buy. We're all in this war together—business men, farmers and workers. Increases come out of everybody's pocket—including *yours*.

6. SAVE FOR THE FUTURE

Money in the savings bank will come in handy for emergencies. And money in life insurance protects your family, protects you in old age. See that you're ready to meet any situation.

7. BUY WAR BONDS

and hold them. Buy as many as you can. Then cut corners to buy more. Bonds put money to work fighting the war instead of letting it shove up prices. They mean safety for you tomorrow. And they'll help keep prices down today.

KEEP PRICES DOWN . . .

Use it up . . . Wear it out . . .

Make it do . . . Or do without.

This advertisement, prepared by the War Advertising Council, is contributed by this magazine in cooperation with the Magazine Publishers of America.

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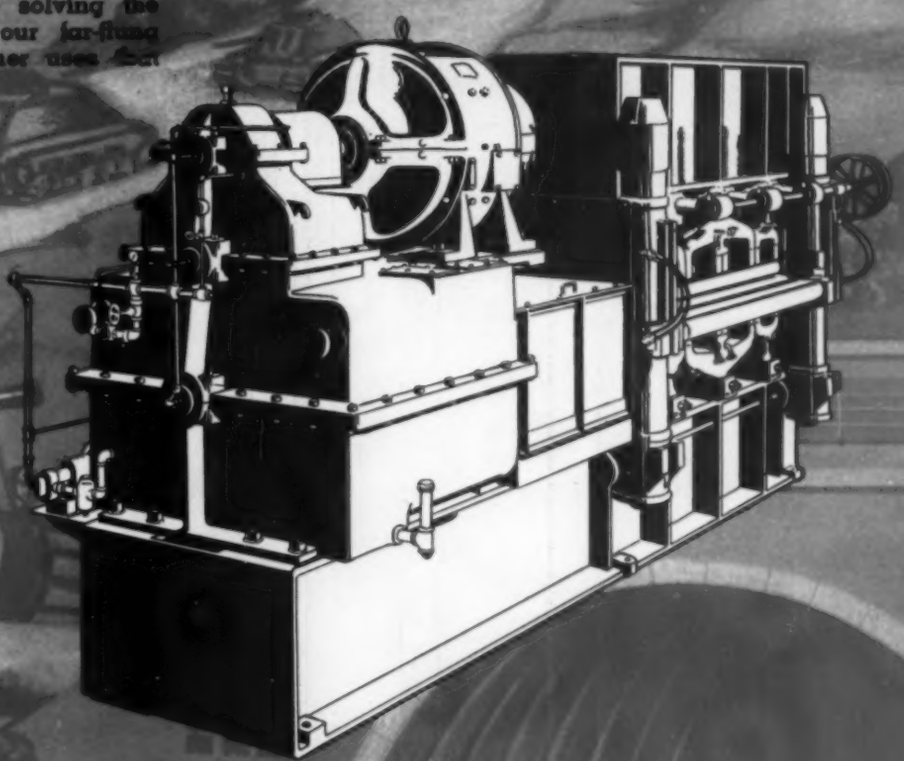

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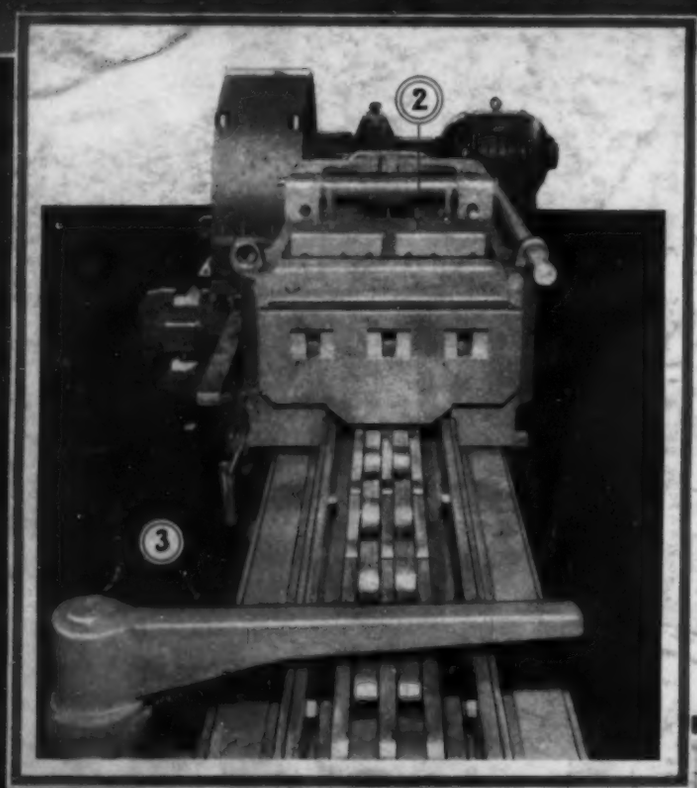

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